IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication NOVEMBER 30, 1961

★ Big Question in '62 Steel Labor:

Will Steelworkers Miss Arthur Goldberg? p. 109

Should West Sell to Yugoslavia? p. 121

Extrusions Gain From Redesign p. 137

Digest of the Week p. 2-3

250,000 full turns, more than a lifetime of service, and the amount of wear on ratchet drive lugs, or tangs, is practically unnoticeable. Corners remained sharp and clean and the surface unmarred.

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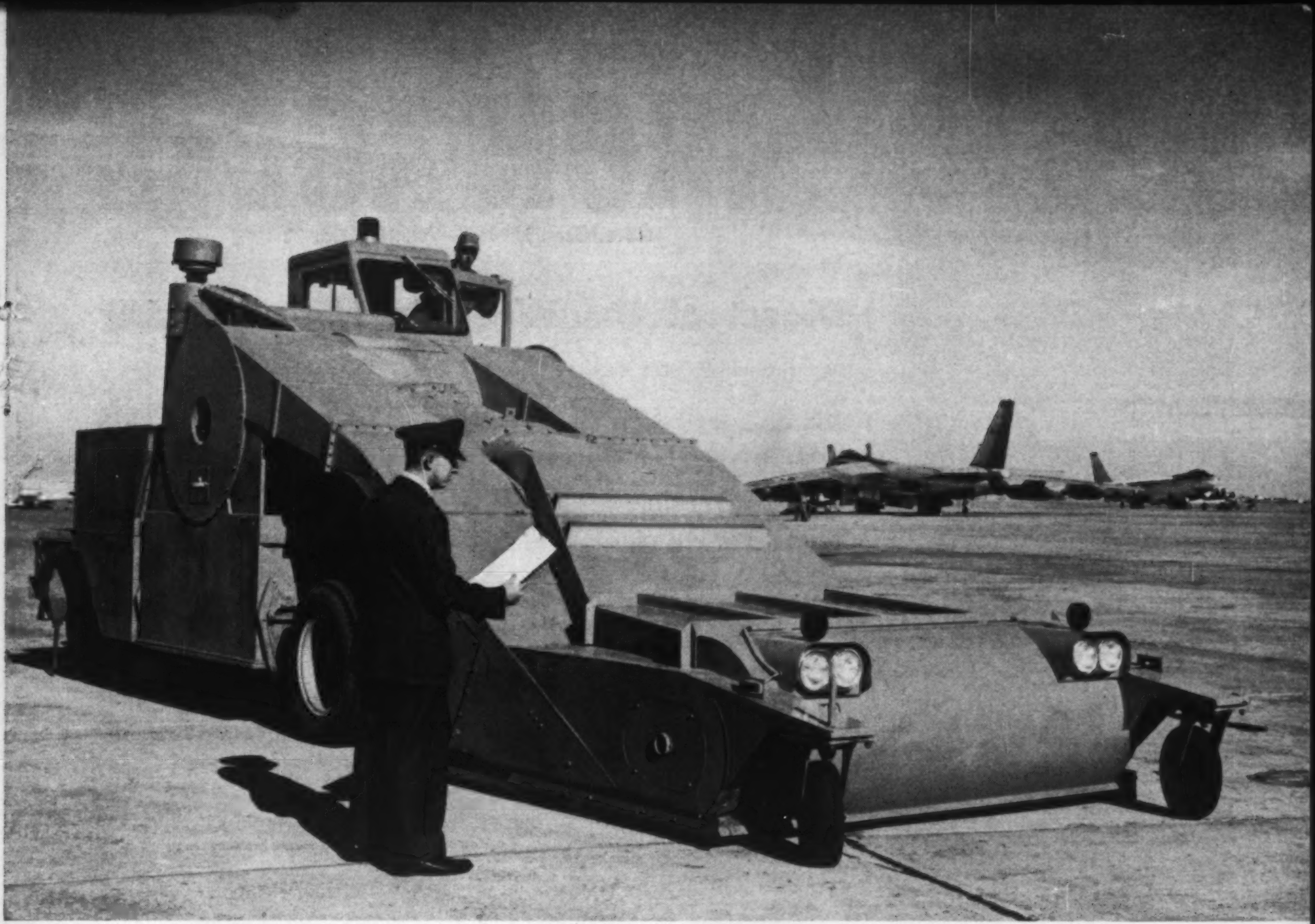

Forbes Air Force Base, Pauline, Kansas, received one of the first of 180 vacuum cleaners built by International Fermont Machinery Company, Inc., Ramapo, N. Y. Built of Bethlehem abrasion-resisting steel, it can clean 1 million sq ft of runway per hour.

Jet runways vacuumed spick-and-span by giant cleaner

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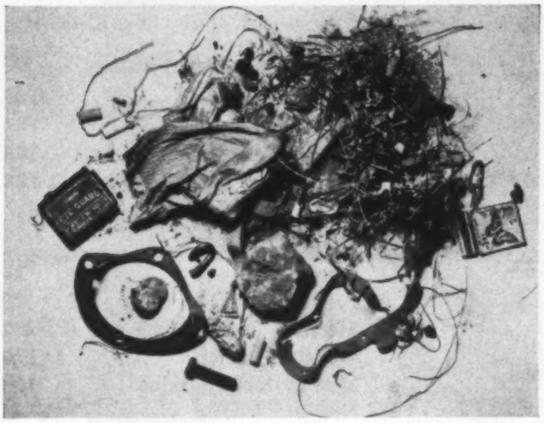

This "typical meal" shows a number of objects large enough to cause serious damage in jet-engine intakes.

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Special This Week

Can Steelworkers Replace Goldberg?

Steel negotiations are next year's top item on the labor-management agenda. But it will be different this time. Arthur Goldberg, rated Dave McDonald's "brain" in many past battles, is a neutralist on the sidelines as Secretary of Labor. His former law partners have taken over USWA counselling duties. p. 109

Yugoslavia: How It Trades With West

A former Iron Age associate editor reports how Yugoslavia is extending its trade relations with the West. More than 70 pct of its foreign trade is now with non-Communist countries. The data is timely in view of the debate on U.S.-Yugoslav trade. p. 121

Extrusions Gain From Redesign

More and more fabricators are using aluminum extrusions for custom-styled parts. Low tooling costs and other inherent traits make extruded aluminum the logical choice for short runs. For higher outputs, simple automation is easily effected. p. 137

Next Week

Congress Gets Set for Trade Battle

Protectionist feeling is rising again in Congress as the Kennedy Administration shapes a program for more liberalized U.S. trade. It will be the main, and perhaps most bitterly contested, issue in the next session. Next week's report examines the arguments.

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Anti-Business Thaw? It's Too Early Yet to Tell

Now that the Administration has sworn it isn't anti-business, some say a thaw is underway. Maybe it is.

There are signs that men such as U. S. Steel's chairman, Roger Blough, are operating a little more cozily — relatively, that is — with government officials.

Also, Joseph Block, Inland Steel's chairman, recently had some reasonable things to say about government's role in our economy. But some people improperly interpreted Mr. Block's statements as meaning he was not averse to government intervention in wage settlements.

The President's advisors have made a show of turning the other cheek. Some have gone so far as to say, "Who, me?" thus reversing a stance of a few months ago.

All of which shows that being pro-business or anti-business is a very complex thing. You just can't say, "I am for business," or, "I am against business," and let it go at that. If it were that simple, the whole thing could be put on ice with a few drinks and some cigars.

Maybe you could argue for years on that question. But if you were to ask 100 businessmen if they think the government today is anti-business, the majority would say yes. Some would say they never had it so good as when Harry Truman was President.

A check of many businessmen at various levels showed us that most of them felt the government had made no basic change in its attitude. They think a thaw could come. Most of them are ready to give the President—if not his advisors—the benefit of the doubt. Some have their fingers crossed.

The gist of our questioning brings next year's steel labor hassle to the forefront. What the Administration does with that sticky problem will answer the question of whether or not there has been a change in the Administration's attitude towards business.

If, as in the past, the union gets about what it wants with government help, and the steel industry gets higher costs with pressure for price stability, then the answer is simple. If the union is put in the same straitjacket as the industry has been in on innumerable occasions, then the answer might be, "Some change."

Thus, if government bails out the union, the answer is, "No change!"

Tom Campbell

Editor-in-Chief

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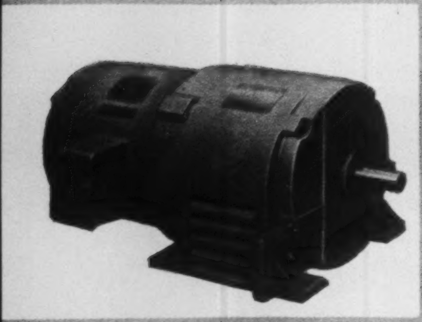

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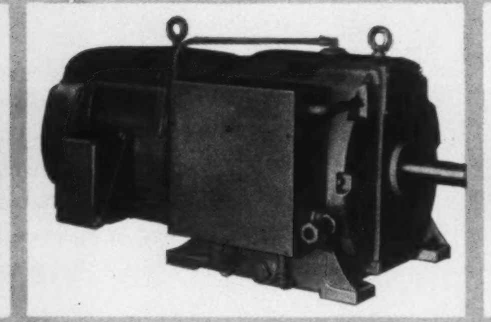

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Production Up; Headed Higher

The October production index of the Federal Reserve Board was pegged at 113. This equals an all-time high first made in August.

The index will probably hit a new high—around 118—next March. Seasonal influences and an uptrend in the cycle and scramble for steel will be in high gear then.

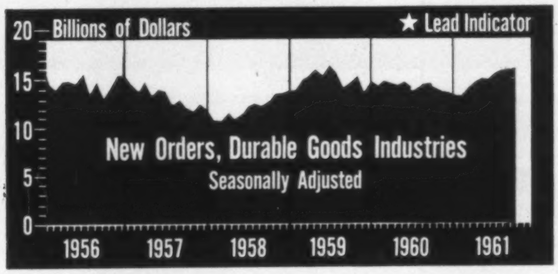
The steel scramble will spur a chain reaction in supplier industries; freight car loadings, coal, ore, refractories, scrap, pig iron and alloys.

And the expected spring bulge in car output will step up business in car supply lines; ferrous and nonferrous metals, fabrics, paint, leather, car loadings and truck loadings, and plastics.

Add record-breaking construction support, and a good sized "medium" boom is clearly on the horizon.

Durable Goods Orders Up Again

New orders for durable goods hit a new record of $15.9 billion in October. This also marked the ninth straight month that new orders have been greater than sales. Durable goods sales for the month totaled $15.3 billion.



The fact that new orders are continuing to outrun sales is heartening. Even more heartening is the fact that the orders-sales gap is widening. In the two-month period of September and October new orders exceeded sales by $1.3 billion. This compares to a $1.5 billion gap for the entire previous seven months.

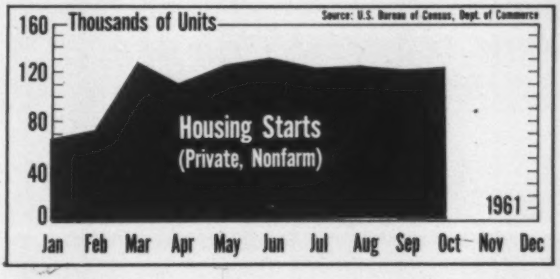
$1 Billion Steel Profits Due

The steel industry will earn close to $1 billion next year, says a top analyst. P. E. Albrecht of Merrill Lynch, Pierce, Fenner and Smith, Inc., feels the industry will make about $12.50 on every ton shipped in 1962. This is about the industry average for 1958-60. It is under the $14 a ton average for 1955-57.

Assuming production of 110 million tons next year, and shipments of 79 million tons, Mr. Albrecht says steel profits will approach the $1 billion mark. If the proposed tax credit plan is approved, another $100 million could be added to earnings, he claims.

Housing Picture Brightens

Private non-farm housing starts rose to 121,900 in October, up from 120,500 in September. And the seasonally adjusted annual rate of home building starts rose by 47,000 in October to 1.4 million. Gains were scored in all parts of the country except the northeast.



Source: U.S. Bureau of Census, Dept. of Commerce

The big point in these figures is that housing starts have been bumpy, and one of the gray areas of the recovery. There is hope in the gains scored in October because of the broad base in these gains.

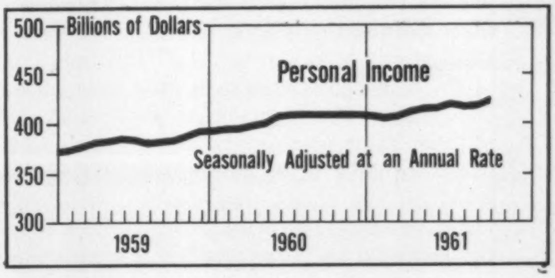
But a close eye must still be kept on rising housing finance costs. These rising costs could nip further gains.

Income Hits A New Peak

Personal income hit a seasonally adjusted annual rate in October. This tops July's $421.2 billion, the previous high. The jump is all the more notable in that the July figures were fattened by $1.8 billion in stepped-up payments of GI insurance dividends.

The October income jump was based largely on record factory payrolls.

But income is a coincident indicator, not a leading one. Only a 'potential' added boost to business is indicated in higher income. How it will be spent is still a big question—and challenge to business.



Widest Galvanizing Line in the world built by Wean for Armco Steel Corporation

Designed to turn out zinc-coated steel coils and sheets up to 72″ in width, this new Wean galvanizing line was recently installed at Armco Steel Corporation's Middletown, Ohio, plant.

The tremendous increase in production offered by this mammoth installation will enable Armco to take advantage of the rapidly growing demand for zinc-coated steel sheets, and its extreme width will open new possibilities in design and fabrication for Armco's customers.

Employing the Armco-Sendzimir process of annealing and coating in one continuous operation, this line is capable of handling coil weights up to 50,000 pounds and strip gauges from 11 through 22. The line operates at speeds up to 300 fpm.

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Steel Industry Cuts Salaried Workers

In spite of employment gains of over 5000 in the steel industry as a whole, the number of salaried workers dropped during September. According to the American Iron & Steel Institute, the number of salaried workers had been on the rise during the three previous months.

Hourly employment followed the trend of total steel employment and continued to rise for the eighth straight month. Comparing with 1960 figures, total steel employment was up 19,000. Salaried employment was down about 3000 from last September. Approximately 23,000 hourly workers were added since September 1960.

NLRB To Test Union Discipline Rights

The NLRB is moving to test union rights to fine members for exceeding union-set production standards.

The test case charges a UAW local with committing an unfair labor practice in violation of the Taft-Hartley Act. The case involves employees of the Wisconsin Motors Corp., West Allis, Wis.

The local had ruled that members produced, under piece-work, more than they should have when their pay exceeded a ceiling decreed by the union. Two of the six fined paid up, but four did not. The union took the case to court.

The men then sought an unfair labor practice complaint from the Chicago regional director of the NLRB. It was denied, and the four then appealed to the general counsel of the NLRB. He, in turn, has ordered a complaint issued against the local.

The Wisconsin case follows a recent decision in Ohio where five members of a UAW local were fined and three suspended from the union for exceeding a work rate set by the union in a plant slowdown.

The new NLRB complaint intends to test how far a union can go in disciplining its members without violating the T-H clause stating it is illegal for unions to "restrain or coerce" employees.

What AFL-CIO Wants From Congress

The AFL-CIO will try to turn this year's Congressional disappointments into next year's successes. Union officials are after Congress to act on the following labor-oriented items when it returns in January:

A public works bill for construction of public facilities to create new employment.

The proposed plan for Federal subsidies for retraining jobless workers.

Establishment of Federal standards for unemployment compensation to replace state systems.

A proposal to give the Secretary of Labor additional power to protect union pension and welfare funds.

A reform of the National Labor Relations Board, including a speed-up of unfair labor practice cases.

Repeal of Taft-Hartley provisions allowing right-to-work laws.

Next Step in Walsh-Healey

The electric lamp industry is the next industry group scheduled to step forward under the Walsh-Healey Act.

Secretary of Labor Arthur J. Goldberg has called the industry W-H wage hearings for Jan. 3.

In review, the W-H Act authorizes the Secretary of Labor to determine minimum wages, on the basis of prevailing wage levels, for employees working on Government contracts over $10,000.

The current determination for the electric lamp industry is $1.26 per hour. The government buys some $20 million annually from the industry.

The Walsh-Healey Act is undergoing a speed-up program for quicker determinations. Other industries where minimums are to be set are machine tools, fabricated structural steel, electronic equipment, and motors and generating industries.

The machine tools case is shaping up into a precedent-forming issue. The unions in the industry have asked for a minimum of $2.15 per hour, including 22 cents for fringe benefits. This is the first time labor has sought fringes in a W-H determination. Industry officials put the minimum at $1.60.

In the electric lamp industry, those testifying are asked to furnish data on minimum wages paid in the industry, the number of workers paid the minimum rate, extent of competition among plants in different geographic areas, and changes in minimum wages since June, 1961.

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By R. W. Crosby

★ Government Building Booms

Federal government construction, with a new accent on space facility work, is increasing rapidly. The increase means a long-term upswing in federal purchases from the U.S. construction industry.

Right now the federal government buys many billions of dollars worth of construction services each year. In 10 to 15 years the experts expect federal construction purchases to double.

The content of new orders will range as widely as the agencies involved in federal construction. Buyers for the government in the construction field include: The General Services Administration; Army Corps of Engineers; Navy Bureau of Yards and Docks; Air Force Civil Engineers; National Aeronautics and Space Administration; Bureau of Reclamation; Bureau of Public Roads; Atomic Energy Commission; and the Veterans Administration. Almost all of these agencies forecast rising construction work.

Some of the major areas of expanded government construction are:

Space—the newest construction program, the building of research, testing, and launching facilities, is predicted to be at least a half-billion dollar a year construction job.

Shelters—The Civil Defense shelter program could eventually involve many billions of construction dollars partly financed by the government.

A national fallout shelter program survey, under Defense Dept. direction, is underway.

Public Works — government plans call for catching up with the big backlog of scheduled water resources projects and highway needs.

Defense—Lt. Gen. W. K. Wilson, Jr., Chief of the Army Engineers predicts: "Defense construction will in all probability continue to be extremely large—with prospects for new elements such as anti-missile construction to be considered."

■ Unit Promotes More Defense Buying Bids

After years of battling over how defense contracts should be awarded, the Pentegon has shifted its policy. It has started a program to get more competition in defense buying.

The major step toward more competitive bidding will be the duty of the new Logistics Management Institute, a private group under government contract to improve business management of the Pentagon.

One of the Institute's immediate projects, says Defense Secretary McNamara, is to study "ways to increase competition in the purchase of production quantities of new military equipment and in the purchase of components and parts."

■ Administration Seeks Free Trade Support

The Kennedy Administration is rounding up as many top-flight businessmen as possible to support its proposals for freer foreign trade.

Administration aides, cabinet members and federal agency officials down the line are trying to line up industry backers for the President's trade proposals.

The Administration thinks it has a better chance of pushing its trade proposals through Congress next year if it is not opposed by all industry.

The President is getting support from a group of businessmen which promotes freer trade. This group, the Committee for a National Trade Policy, will assist him in his drive.

This group has already come out with a resolution to give the President broad authority to negotiate tariffs. The group seeks federal aid to help industries hurt by import competition.

■ FTC Wants To End Lengthy Proceedings

Federal Trade Commission sources say they will push for more power in the next Congress. They want authority to order a company to stop unfair trade practices without endless proceedings.

A bill before Congress would give the FTC this power. It would allow the FTC to issue cease and desist orders with only a short hearing necessary. The plan, which allows firms recourse in the courts, is supported by President Kennedy.

■ JFK Will Not Seek Wage Control Power

A question is being raised in Washington: Will President Kennedy ask the next session of the Congress for standby authority to impose price and wage controls in the event of national emergency?

Administration sources doubt it. Though the authority would be good for preparedness, they say, it would probably be harmful by creating a war scare.

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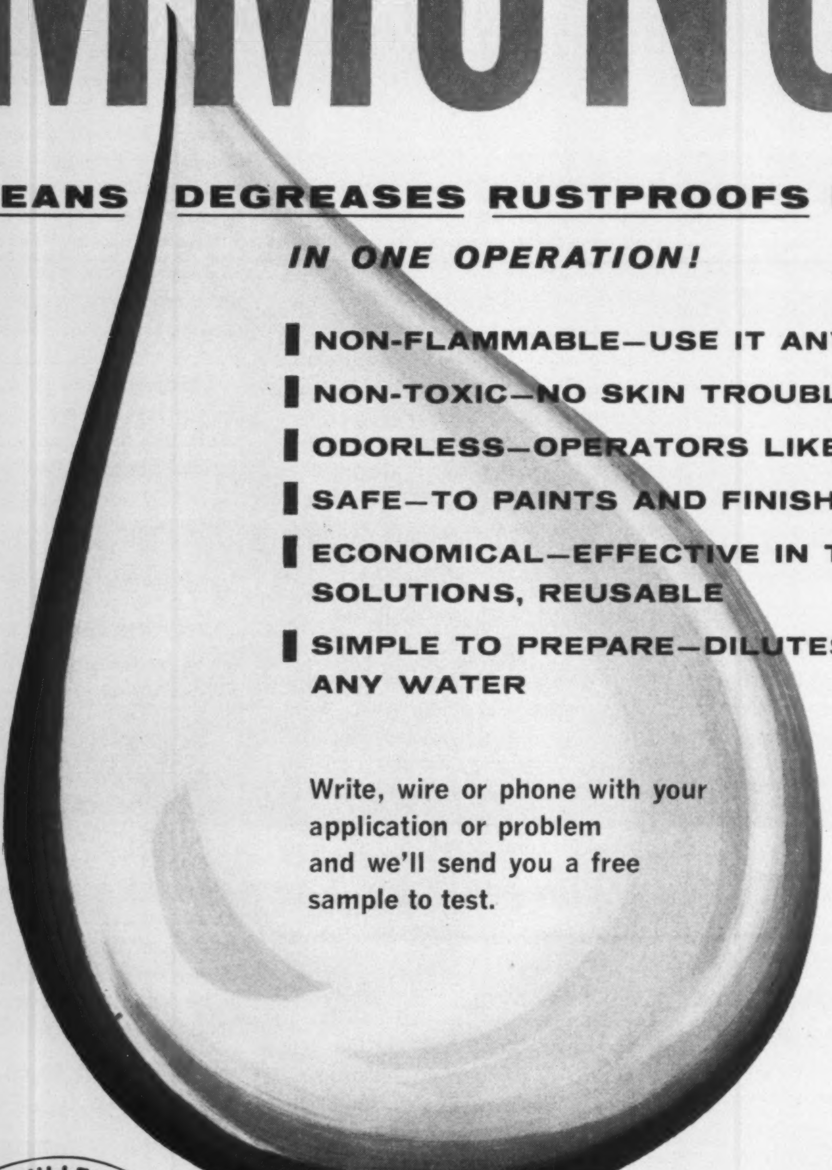

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S. America Unites As Troubles Grow

Seven South American countries have taken the first step toward economic integration.

They are now negotiating reciprocal tariff concessions, to become effective Jan. 1, 1962. Then, the Latin American Free Trade Assn. will be officially in business.

The negotiations are the first of 12 annual sessions. They will remove customs duties and other import restrictions between the member countries, at a minimum reduction rate of 8 pct annually, reaching duty-free status in 12 years.

LAFTA comprises Argentina, Brazil, Chile, Mexico, Paraguay, Peru, and Uruguay, plus two adhering countries, Colombia and Ecuador.

The seven original signers produce 41 pct of the iron ore in Latin America; 51 pct of the gold; 73 pct of the coal; 89 pct of the silver; 94 pct of the lead; 97 pct of the zinc and copper; all of the sulfur and nitrate; 92 pct of the steel ingots; and 97 pct of the finished steel.

It's a growing new market. And, like Europe's growing Common Market, it poses new problems and challenges for U. S. industry.

While some South American countries look to the future through LAFTA, troubles continue to plague the continent.

The Alliance for Progress mood has been given new setbacks. As predicted, those who looked for fast action have come back from survey trips pretty well discouraged.

Most of the gloom has been brought about by recent uprisings, lack of progress, and the financial plight of major South American nations.

Brazil is now flirting with nationalistic—but leftist—forces. And in a stringent economy move, Brazil government agencies have been prohibited from purchasing any but absolutely essential items until after Jan. 10.

Argentina is still in trouble. Venezuela is still trying to "get started."

Biggest drawback to Alliance for Progress improvement is basically the almost complete lack of a large middle class. The spread between rich and very poor is a vacuum which may take years to fill.

Until then, high level families will take what they can get; looseness of official spending of aid funds will continue; and unrest at the bottom of the social ladder will remain ominous.

West German Steel Slump Continues

Many West German steelmakers expect the current recession to continue into the fall of 1962.

But one figures it will end by May or June of next year. H. J. Sendler, chairman of the Rolled Products Section, German Iron & Steel Federation, feels the pickup will begin then. But he notes Ruhr steelmakers are now planning production cutbacks up to 20 pct.

West Germany's steel setback has been confined to the domestic market. Export volume has been maintained, but only at the cost of price concessions.

Long-term outlook for German steel is good, however. The recession is blamed almost entirely on consumer stock reductions. There is little tendency to postpone or revise investment plans.

Rolled for Reds

Colvilles Ltd. of England will roll 60,000 tons of Russian steel in its new cold reduced strip mill. The steel will be shipped to England in coils. It will be cold reduced and sent back to the Soviet as sheets.

Rail Diesel Rides Ashore from Ship

After a "beach landing," a main line diesel locomotive went into service on the railroad of Kaiser Bauxite Co. at Jamaica, West Indies.

SHIP-TO-SHORE: Diesel ride.

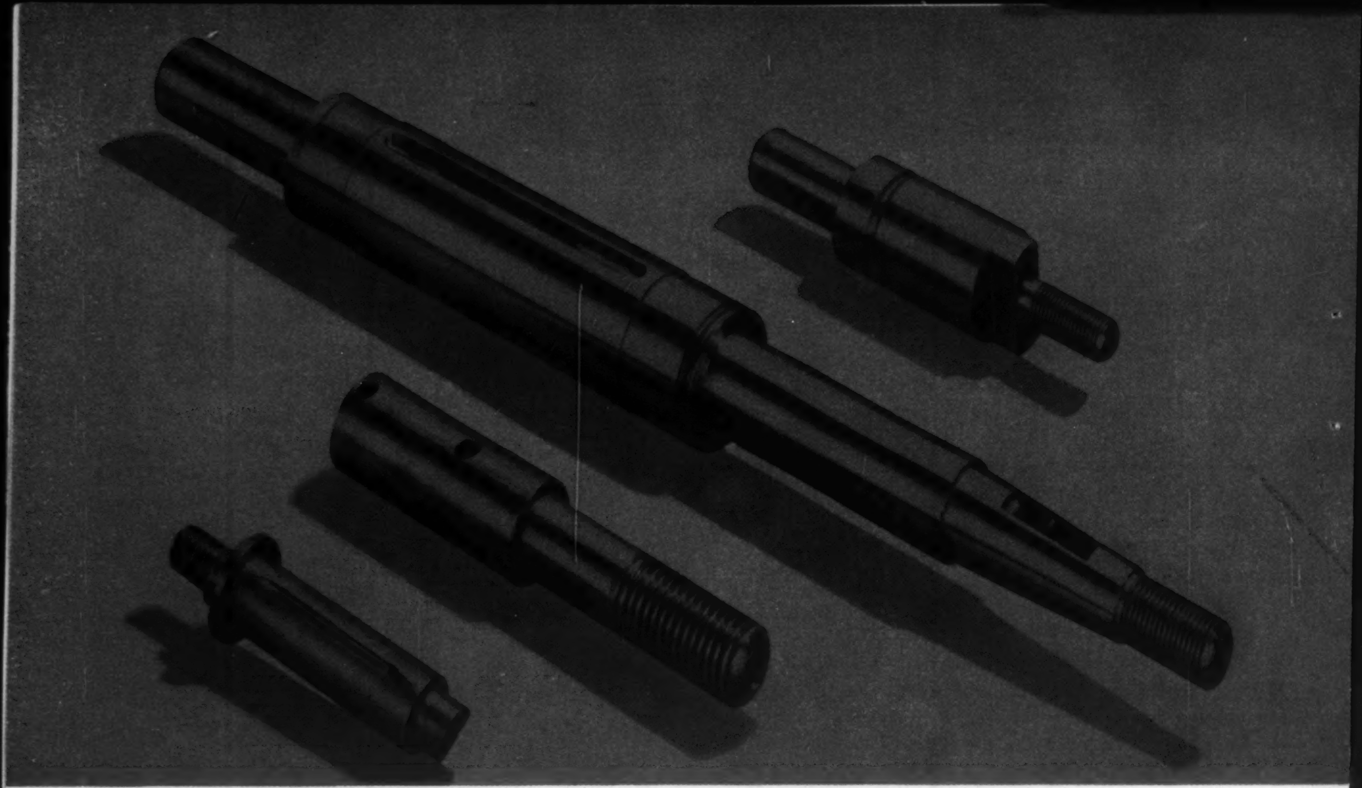
The locomotive was put ashore within 3.5 hours from a 135-ft vessel patterned after amphibious landing craft. Kaiser personnel graded the slope of the beach and laid a track to within a dozen yards of of the water's edge. When the vessel was beached, its landing ramp was lowered. More track was laid to join the rails on which the locomotive rested on the ship's deck.

Australians Seek U. S. Partners

More than 25 Australian companies are now seeking U. S. business partners, on either a joint venture or licensing basis.

Among the Australian companies are manufacturers of sheet metal products, wire products and hardware, precision tool gages, metalworking machinery, automotive parts, and machine tools.

The companies are listed in a catalogue, published by New South Wales Government Office, 680 Fifth Avenue, New York 19, N. Y.



Maintenance Department

Cuts cost of 70 different repair parts up to 65% with Stressproof® steel bars

STRESSPROOF steel bars are used almost exclusively in a large textile producer's maintenance program for 1200 looms and spinning frames. Several hundred high-strength repair parts a year are needed to keep the machines running 24-hours every day with minimum down time. All parts are made of STRESSPROOF in the company's own maintenance shop—sometimes with a "run" of 100 parts of a kind.

The company's maintenance supervisor selected STRESSPROOF strictly by elimination. He reports the following advantages. He can machine faster with STRESSPROOF. He gets a better finish after machining. STRESSPROOF gives him stronger, harder parts. Parts made of STRESSPROOF wear longer . . . break less often in service. He doesn't have to bother with heat treating and its accompanying costs such as cleaning, straightening, secondary machining, and extra handling.

In short, it actually costs less to make his own parts from STRESSPROOF than to buy factory replacement parts . . . and he says he gets better parts.

Look at these typical savings:

Part: Four-threaded worm		Part: 1⅞″ x 65″ Spinning journal	
Factory replacement cost	$11.45	Factory replacement cost	$22.00
Total cost using STRESSPROOF	3.50	Total cost using STRESSPROOF	17.00
Savings per piece	$ 7.95	Savings per piece	$ 5.00

Stressproof is available from your steel service center

What do machine repair parts cost you? . . . Mail this coupon and prove to yourself that STRESSPROOF can save you money . . .

☐ Please send me your free booklet "How to make your own machine and repair parts quicker and easier."

La Salle STEEL CO.

1436 150th Street
Hammond, Indiana

name ______________________ title ______________
company ______________________________________
address _______________________________________
city and zone ___________________ state __________

Sound Waves Destroy Foam

Foam is finding more and more industrial uses. But in excess, it's hard to control and as welcome as the plague. One of the highlights of this week's Chemical Industries Exposition centers on a new defoaming system. Visitors at New York's Coliseum can trigger a sonic-energy transducer to explode foam bubbles by employing the physical action of intense sound waves.

Improves Printed Circuits

Two oval-shaped lines form what's probably the world's largest gold plating facility. These lines plate 114,000 printed circuit cards a day. About 0.00015 in. of gold, over 0.001 in. of nickel is plated on each circuit card's contact tabs. Tanks in the automated lines hold 500 oz of gold in continuously agitated solutions.

Water-Thinned Paints

"Industrial use of water-thinned coatings will show a big increase during the next 10 years," says S. W. Gloyer, of Pittsburgh Plate Glass Co. He cites industry's constant effort to improve the safety factor in all manufacturing stages as the prime reason for a growing trend toward nonflammable coatings. Mr. Gloyer adds: "Automakers are out in front in accepting the greatly improved water-base paints which are now available."

Armor: Space-Age Version

Soviet scientists have developed synthetic fibers that reduce chemical, biological and radiological hazards. These man-made fibers have high melting points, superior stress-strain properties and excellent chemical repellency. One use for the newcomers is personnel armor for ballistic and nuclear protection. Industrial uses may include containers for chemical storage.

All-Aluminum Ships

With three major projects stowed away, aluminum is fast becoming the standard marine construction material for hydrofoils. Current programs will yield large ocean-going hydrofoils that are almost all aluminum. They'll serve as prototypes for larger passenger-cargo liners and naval warships. Hydrofoil ships depend upon the lift generated by wing-like foils moving through water.

Efficient Ore Pelletizer

Savings in heat and fuel result from an improved iron-ore pelletizing furnace. Ore pellets descend through a hot shaft where they're heated by hot gases to about 2300°F. Then they drop into a cooling chamber. Here, a continuous air current cools the concentrated pellets to about 200°F. Heated air from the cooling chamber preheats the combustion chamber's draft. This cuts down on the amount of fuel that's consumed.

High-Energy Fuel Cells

A breakthrough in fuel cells will soon be announced by a Midwest research institute. With the new development, efficiencies to 90 pct are claimed. The new cells use hydrogen and oxygen with an inorganic ion-exchanging membrane that withstands ultrahigh heat. Resistance to radiation and portability are other advantages.

More Tinplate From Japan?

One of Japan's leading tinplate producers is adding an automatic data accumulator to a 38-in. electrolytic tinning line. Standard sensors actuate this inspection system. A permanent record of every coil's quality will be typed out. Solid-state devices and magnetic data-storage drums serve throughout the system. The Japanese expect the improved tinplate quality to pay off by boosting overseas sales.

Computer for Hot-Strip Mill

Off-gage thicknesses at the end of a run create waste in hot-strip rolling mills. However, this tail-end effect will soon be curbed. A computer-controlled hot-strip mill, now in the works, operates with constant interstand tension. The computer can handle mill setups, data logging and processing, and production scheduling. Automatic loopers eliminate "grow-back" problems caused by hardness variations in the strip.

ONE complete source

for all electroplating and metalfinishing equipment

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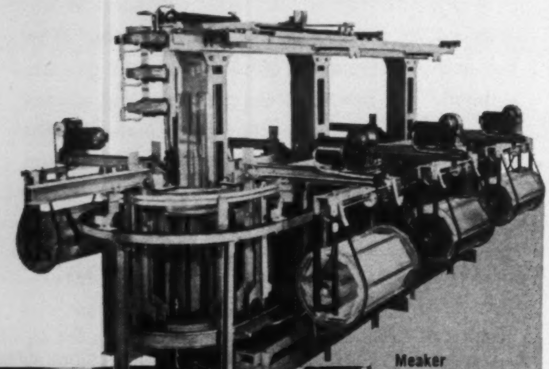
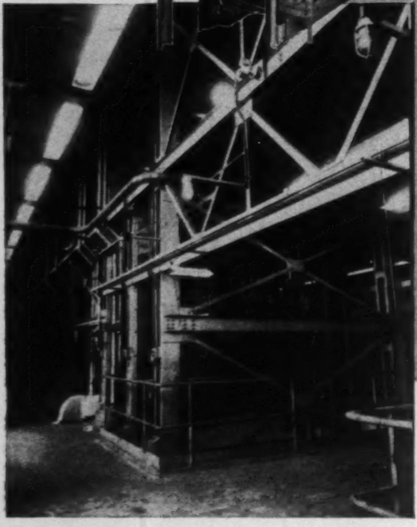
MEAKER
1899

Automatic equipment and systems for continuous or batch metal finishing...from the "compact-a-matic" for precision plating of small components with limited production...to the world's largest automatic plating installation occupying 180,000 square feet... MEAKER has been the preferred source *since 1899*.



Meaker "Compact-A-Matic"



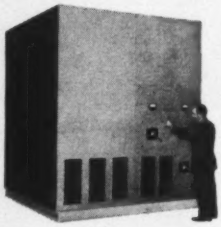
Partial view of world's largest automatic plating installation

Sel-Rex RECTIFIERS

Silicon • Selenium

Dependable DC power for electroplating, electropolishing, electrocleaning and anodizing.

Units from 25 to 50,000 amps with manual, automatic and remote controls "custom-engineered" to your requirements — at no premium in cost.



Sel-Rex JET PLATER®

For Precision High-Speed Precious Metals Plating

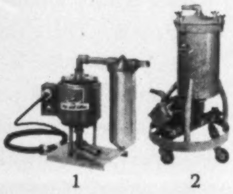
The complete precious metals plating facility in a single compact cabinet can be used for either rack or barrel plating... perfect for precision-plating of critical electrical or electronic parts, specification precious metals plating or "pilot plant" set-ups.

Sel-Rex SOLUTION FILTERS

Portable and mobile units for all liquid clarification needs.

1) 600 Series—PRE-MET FILTERS. Guaranteed leak-proof operation—flow rates from 25 to 800 GPH.

2) Double-duty Series — New stainless steel mesh element which doubles effective filtration area— flow rates from 250 to 18,000 GPH — greater capacities to order.



THE MEAKER COMPANY
Subsidiary of Sel-Rex Corporation
Nutley 10, New Jersey
Factories and offices Chicago 50, Ill., and Nutley 10, N. J.

When superhard-finished aluminum shows no wear in six years . . .

ALCOA ALUMINUM
ALUMINUM COMPANY OF AMERICA

When superhard-finished aluminum shows no wear in six years . . . .

that's Alcoa Total Ability at work!

Molding earth-mover tires takes 1,000 psi minimum at 200 to 325°F for as long as 12 hours straight. Six years ago, the world's largest tire tread mold insert, 36.00 x 41—an *aluminum* casting—was hard-coated by the Alcoa® Alumilite* process. No wear has been found and none is expected.

Originated and developed by Alcoa research, the Alumilite process gives aluminum a "file-hard," thick, dense coating. Formerly, passenger-car tire molds wore past tolerances in just 30 days. With Alcoa's Alumilite Hard Coating, their service life is indefinite. Other coatings hard enough to protect as well cost about *three times* as much.

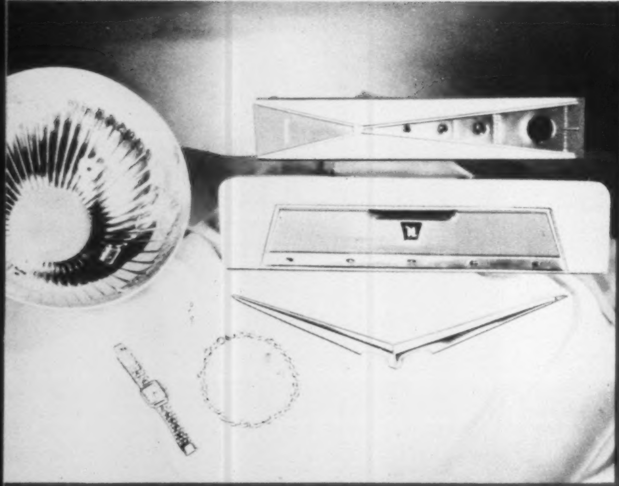
At work or on display, aluminum takes a thousand finishes. Electrochemical processes like Alumilite guard it from weather and wear. The rainbow's colors grace Alcoa Aluminum through surface treatment or finishing. It's textured a hundred ways. A 48-page, full-color booklet, *Finishes for Alcoa Aluminum*, is available. Send for your free copy.

Shapes of aluminum in endless variety also come from Alcoa's forges, foundries, rolling mills and extrusion presses. Truly, imagination's the only limit when *Alcoa Total Ability* works aluminum for you. Learn the difference it can make in *your* products (and profits!). Call your nearby Alcoa sales office, or write: Aluminum Company of America, 855-L Alcoa Building, Pittsburgh 19, Pa.

*Trade Name of Aluminum Company of America

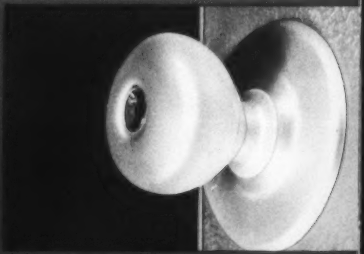
ALCOA ALUMINUM

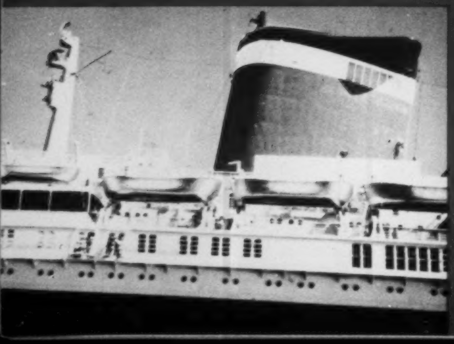
ALUMINUM COMPANY OF AMERICA

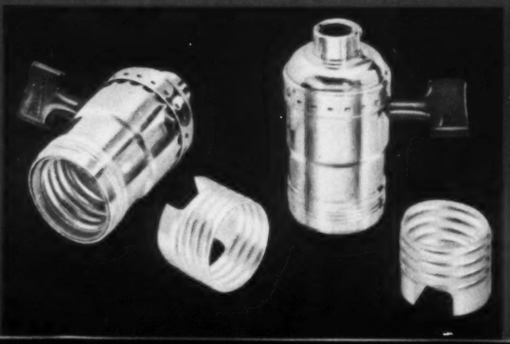


Alcoa Aluminum—the metal with a limitless number of applications—can be finished by every mechanical, chemical and electrochemical method used on other metals . . . and *more!*

You can polish it, blast it, buff it, burnish it, hone it, emboss it, coin it, peen it, etch it, bright-dip it, anodize it, electrobright-dip it, paint it, lacquer it, enamel it, porcelain-enamel it, laminate it, metalize it, satin-finish it.







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LETTERS FROM READERS

Consulting Consultants

Sir—On behalf of my colleagues in this organization and the field of management consultants, permit me a hearty "thank you" to your organization for the article in the Oct. 26 issue, "When to Consult a Consultant."

I think we are in general accord with all the points made in that article. Your writer spelled out the reasons as succintly and as accurately as we would in explaining our roles in the management process.

That this is essential to the industry you serve and to others is, regrettably, obvious each day. Too frequently the professional management consultant is called upon when the barn is afire, and the situation is dire, or not at all . . . —Harvey C. Krentzman, president, Assn. of Management Consultants, Inc., Washington, D. C.

Pet Peeve

Sir—I just finished reading your Nov. 9 editorial, "Lost Art of Listening: Let Us Bring It Back Again." This is a particular peeve of mine, especially when I go to a friend's house and some less-than-bright individual turns on the television right in the middle of a most interesting conversation . . . —Foster A. Babcock, vice president, Doremus & Co., Phila., Pa.

Boost for Foremen

Sir — Your feature article on "Seven Ways to Get Efficiency from Material Handling" (IA, June 29) is undoubtedly a useful contribution to the subject.

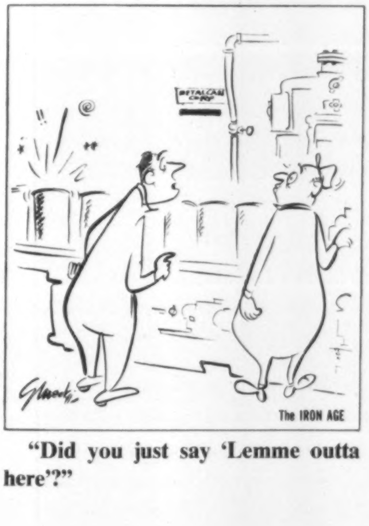
There is, however, one phrase which I find puzzling. In the second paragraph under "hidden costs," where the writer is dealing with the collection of data, he writes, "someone from management, an engineer or **even a foreman** can jot down the needed data during a tour of the plant."

We wonder if this reveals a somewhat archaic impression of the capabilities of today's foremen. I am sure that we could ask any of our experienced foremen not only to "jot down the needed data" but to carry out the necessary calculations and give us a worthwhile analysis of the results. Through our contacts with other production management people, we would say that this is true in a number of manufacturing organizations today. — J. H. Washburn, production superintendent, Canadian Pratt & Whitney Aircraft Co., Ltd., Montreal.

Fabricated Structurals

Sir—In the Nov. 2 issue the article on p. 108 (Customer Plans Keep Mills Guessing) refers to both the backlog and bookings of fabricated structurals. Data on these two elements were supplied by the American Institute of Steel Construction. I would greatly appreciate receiving the address of the Institute.—William Stanley, FIF Management Corp., Denver, Colo.

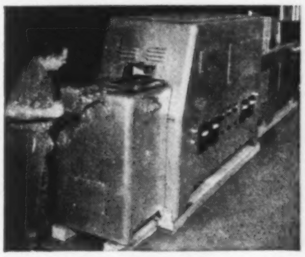
■ **Write to L. Abbett Post, executive vice president, American Institute of Steel Construction, 101 Park Ave., New York 17, N. Y.—Ed.**



"Did you just say 'Lemme outta here'?"

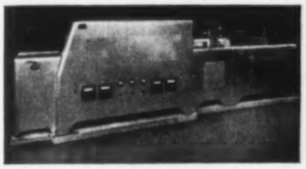
CARL PAULSON,
Dir. of R & D
reports on new

NO-MUFFLE FURNACE for H. S. Steel



Temperatures to 2350°F (high enough for 18-4-1 H. S. Steels) . . . and fast heat up! Complete atmosphere compatibility (nitrogen, dissociated ammonia, endothermic) and quick stabilization to low dew points! High purity refractory . . . selected after testing 11 different materials! And NO MUFFLE* . . . no muffle expense . . . no muffle sag . . . no muffle replacement costs!

That's the story of C. I. Hayes Model FEC Open Chamber Furnace, designed for the plant that wants greater control and greater versatility in their hardening operations. Shifts from one steel to another (H.S., S.S., High Chrome/High Carbon, Cold Header Stock) no longer constitute production problems. Output is clean. Secondary grinding and finishing operations can be reduced or eliminated.



Want facts? Write for Data Sheet FEC-1. C. I. Hayes, Inc., 821 Wellington Ave., Cranston 10, R. I.

*Hayes Muffle-type Furnaces are also available, where required.

C. I. HAYES, INC.
Established 1905

It pays to see Hayes for metallurgical guidance, lab. facilities, furnaces, atmosphere generators, gas and liquid dryers, pHayes-Master (TM) power controls, induction generators.

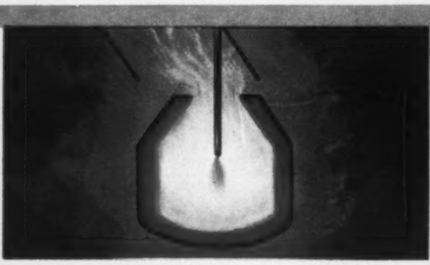
NATIONAL STEEL'S MILL OF

This new 80-inch hot-strip mill at Great Lakes Steel in Detroit—the fastest, most powerful in operation today—advances the art and science of rolling steel a giant step forward. It sets new standards for efficiency while providing auto body sheets and other sheet steels of the highest, most uniform quality yet produced.

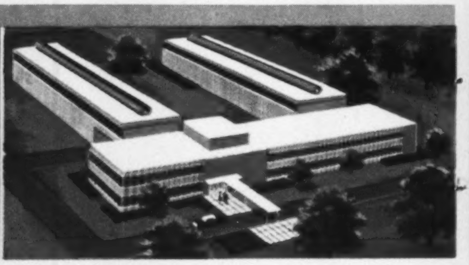
Here's how the Mill of the Future goes about it: Four slab reheating furnaces—the largest ever built—feed the new mill. Together, these furnaces have a capacity of 1,000 tons of 30-foot-long steel slabs every hour. The rolling process itself will be masterminded and controlled by the mill's closed system computer. Coming up with as many as 44,000 computations a minute, it will monitor quality at 200 points along the 2,000-ft. line—keeping thickness, width and temperature right on target at all times. The outcome: giant economy size coils—up to 74 inches wide, 72 inches in diameter and weighing up to 70,000 lbs.—to help manufacturers make their own production more economical.

This 80-inch mill is only one accomplishment in a program of

FIVE OTHER MAJOR STEPS TO FURTHER PROGRESS



NEW BASIC OXYGEN FURNACES at Great Lakes Steel. To be completed in 1962, two basic oxygen furnaces—the largest ever built—which will add new capacity and greater efficiency.



OUR NEW RESEARCH CENTER will be National Steel's headquarters for the expanded, continuing exploration of new and better raw materials, facilities, manufacturing processes and products of steel.

THE FUTURE IS NOW ROLLING

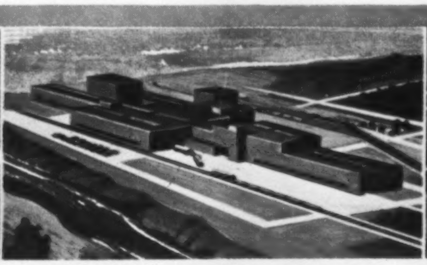
expansion and improvement in which National Steel is investing well over $350,000,000. Among the program's far-ranging benefits: higher efficiency and greater stability throughout our operations, with better, more secure jobs for our employees; a better supply of the highest, most uniform quality steel for our customers; and better values for you, the ultimate consumer of the million and one products made of steel. Other phases of this program will swing into action soon. And we will be bringing you news about them, too.

NATIONAL STEEL CORPORATION, PITTSBURGH, PA.

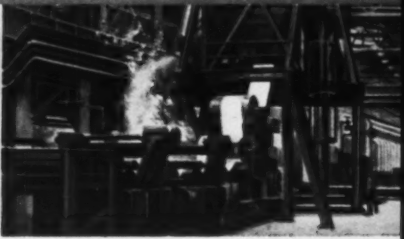
SUBSIDIARIES AND DIVISIONS:

GREAT LAKES STEEL • WEIRTON STEEL • MIDWEST STEEL • STRAN-STEEL • ENAMELSTRIP • HANNA FURNACE • NATIONAL STEEL PRODUCTS

AT STRAN-STEEL in Terre Haute, new finishing-line facilities are boosting quality and output of popular color-coated steel panels for Stran-Steel's handsome new line of contemporary pre-engineered buildings.



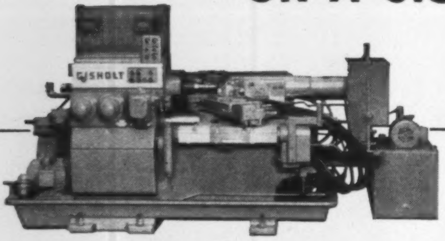
AT MIDWEST STEEL near Chicago, the most modern and efficient steel finishing plant in existence is now providing industry with the finest quality galvanized sheets, tin plate and hot- and cold-rolled sheets.



AT WEIRTON STEEL in Weirton, W. Va., new and improved facilities throughout this division increase the production and improve the quality of Weirton's tin plate, galvanized sheets and cold-rolled sheets.

Do it for less

ON A GISHOLT AUTOMATIC



MASTERLINE No. 12
Automatic Chucking Lathe
Horizontal model shown—
vertical model and larger No. 24 offered.

- Practical for small lots and production runs.
- Rugged construction, ease of control, and fast setup.
- Add a single- or multiple-pass JETracer to reduce tool costs, setup and inspection time, and increase versatility.

If *your* "lost order reviews" dictate more automatic machining operations . . . you'll be surprised and relieved to see how easy it is to cut costs with a Gisholt No. 12 Automatic Production Lathe. New, faster setup methods assure maximum profit on short runs and the speed, capacity and horsepower have been increased to give you maximum production with carbides.

Add a JETracer and complex jobs can be handled during the automatic cycle. Contact Gisholt if you want to do it for less.

GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin, U.S.A.

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Lathes • Factory-Rebuilt Machines with New-Machine Guarantee

FATIGUE CRACKS

After Mr. Goldberg

Editor-in-chief Tom Cambell's last news story was a two-part feature on Japan. (IA, Oct. 26, Nov. 2.) Generally, it was well received by his readers—except for one friendly telephone call.

It's up to us if we send Tom over to Japan, we were advised, but don't let him get too far away from the steel labor situation. There's a big negotiation coming up etc., etc., etc.

Total Coverage—Of course, no one's more aware than we are that there is a big steel labor hassle coming up. In fact, a week seldom goes by without something on steel labor. It could be on the issues, side effects such as steel inventory building, or any of a number of aspects of the upcoming negotiations.

In fact, we were already warming Tom up for our Special Report in this week's issue, starting on p. 109. The angle is a little bit different, but it's part of our policy of total coverage of steel labor. This week, Tom goes into one of the most fascinating sidelights of steel labor:

Inside Story—What is going to happen to David McDonald and his Steelworkers without Arthur J. Goldberg? How much of a void did he leave when he resigned as USWA counsel to become Secretary of Labor? Can he be replaced? If so, by whom?

McDONALD AND FELLER: In the background no longer.

These are the kind of questions our editor-in-chief can answer best. In his years of covering steel labor, Tom knows the ins and outs of the Steelworkers like few others. He feels that to cover steel labor adequately, we have to know the people on both sides. He is proud of the fact that he is as respected and as well known in the offices of the United Steelworkers as he is in the offices of major steel companies.

The First Team—But going back to Mr. Goldberg's leaving Mr. McDonald, he is replaced by his former law partners, David E. Feller and Elliot Bredhoff, now joined by Jerry Anker, of the law firm Feller, Bredhoff & Anker.

These men are strangers to the general public and even to many of those who follow steel labor closely. They were generally in the background, in a way like the picture, at left, below, with David Feller behind Dave McDonald.

But they aren't unknown to Tom, and vice versa. We're sure you'll like this analysis of what's going to happen.

A Crucible Problem

A release from Ohio State University caught our eye recently. In a way, it was more for what was left unsaid, than said.

It seems that a class of graduate students studies a real-life problem that a large steel company is currently facing. The 19 students heard Robert Pitcairn, manager of commercial research of Crucible Steel Co.

Each student was equipped with a dossier of confidential facts, heard the case in a closed session, then worked out a solution.

But that was about it. Now, we can't help being curious. What was the problem? What were the "confidential" facts? Can the company work it out? Will some student be called upon to pull the company out of its problem?

Let POLLOCK rebuild your heavy-duty cranes. Increase bridge speeds and hoisting speeds. Beef-up rated lifting capacities. Alter spans. Convert D.C. to A.C. Install new control systems.

A crane re-engineered by POLLOCK is custom-tailored to *your* shop operations. Contact us, outlining your requirements.

DOUBLE YOUR HOISTING EFFICIENCY...

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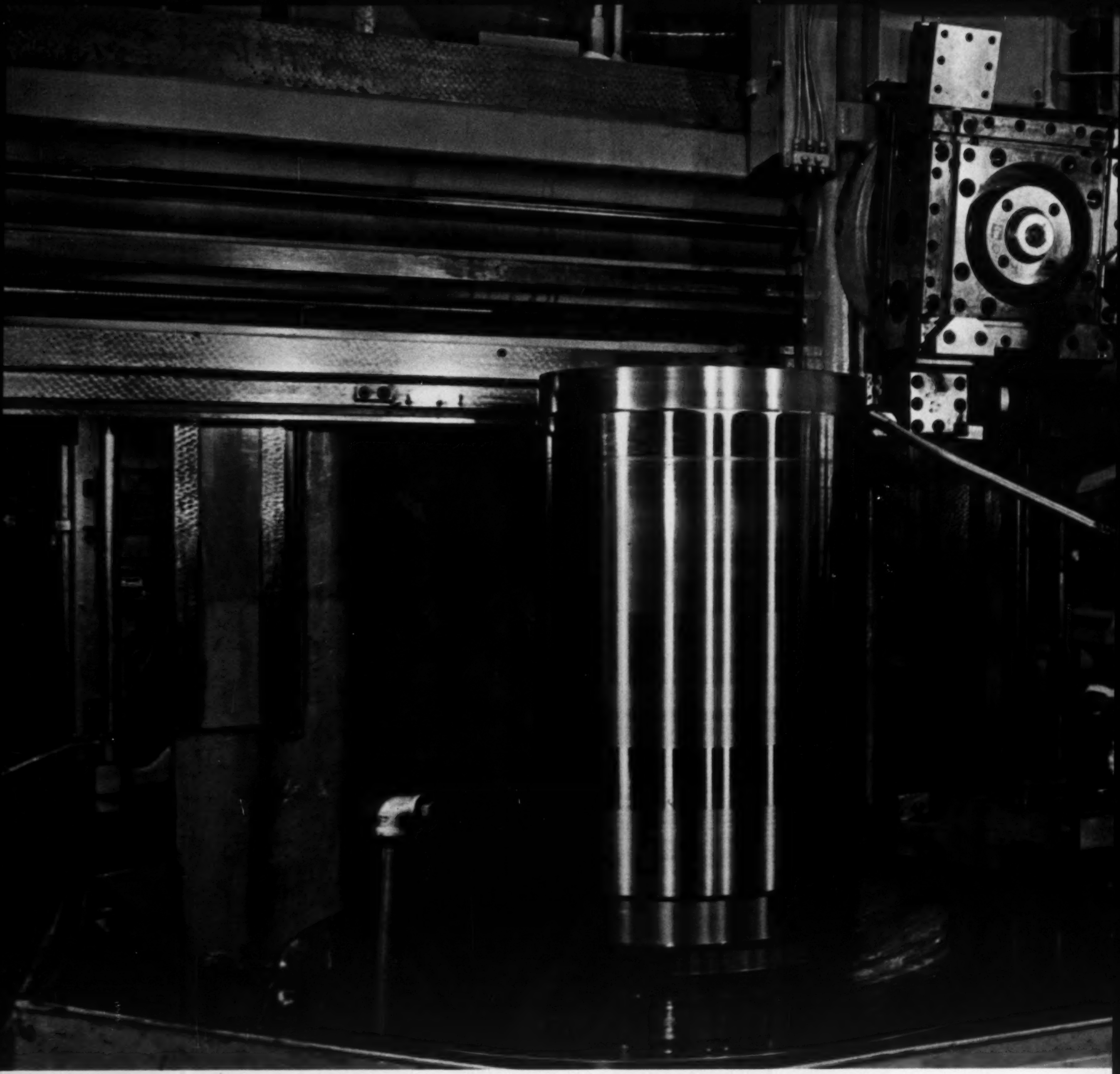


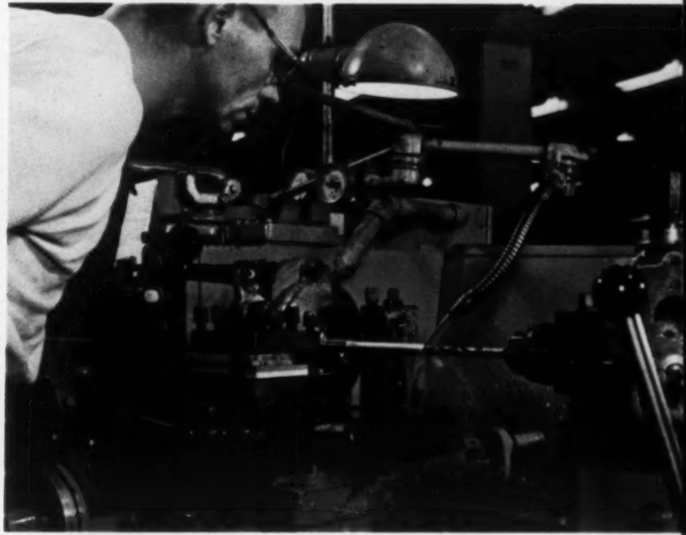
Chance Vought trims production costs with three Gulfcut® oils . . .

Machining operations at the Dallas, Texas, plant of Chance Vought, a subsidiary of Ling-Temco-Vought, Inc., seemed to require an inventory of dozens of limited-purpose cutting fluids. But the large inventory contributed to cutting oil misuse that increased production costs. However, Chance Vought solved this problem with three Gulf cutting oils.

To simplify cutting oil selection, Chance Vought classified machining operations by category. Example: difficult machining jobs involving tough cutting and draggy ferrous metals. Here, Gulfcut 45B is used because it contains an extra-heavy concentration of sulfur, chlorine and fatty oil for excellent load-carrying and anti-weld features.

Another example: aluminum, magnesium and other non-ferrous machining operations where staining is highly objectionable. A versatile compounded mineral-lard oil, Gulfcut 11D, is used on this type of job. This oil's light viscosity also suits it for blending with other oils for special jobs.

Ex-Cell-O thread grinder. Workpiece is a special bolt trunnion attachment of AISI 4130 steel. Excellent tool life is obtained with Gulfcut 41TG. Operators report no rancidity.



Warner & Swasey No. 3 turret lathe. In position is an oil level indicator for an aircraft primary hydraulic system. Gulfcut 11D (light viscosity) keeps chips flowing freely.

◀ Bullard vertical turret lathe. Workpiece is an AISI 4340 steel holder for an explosive die in which aircraft parts are formed. Gulfcut 45B is the cutting oil.

and cutting oil inventory
GULF MAKES THINGS RUN BETTER!

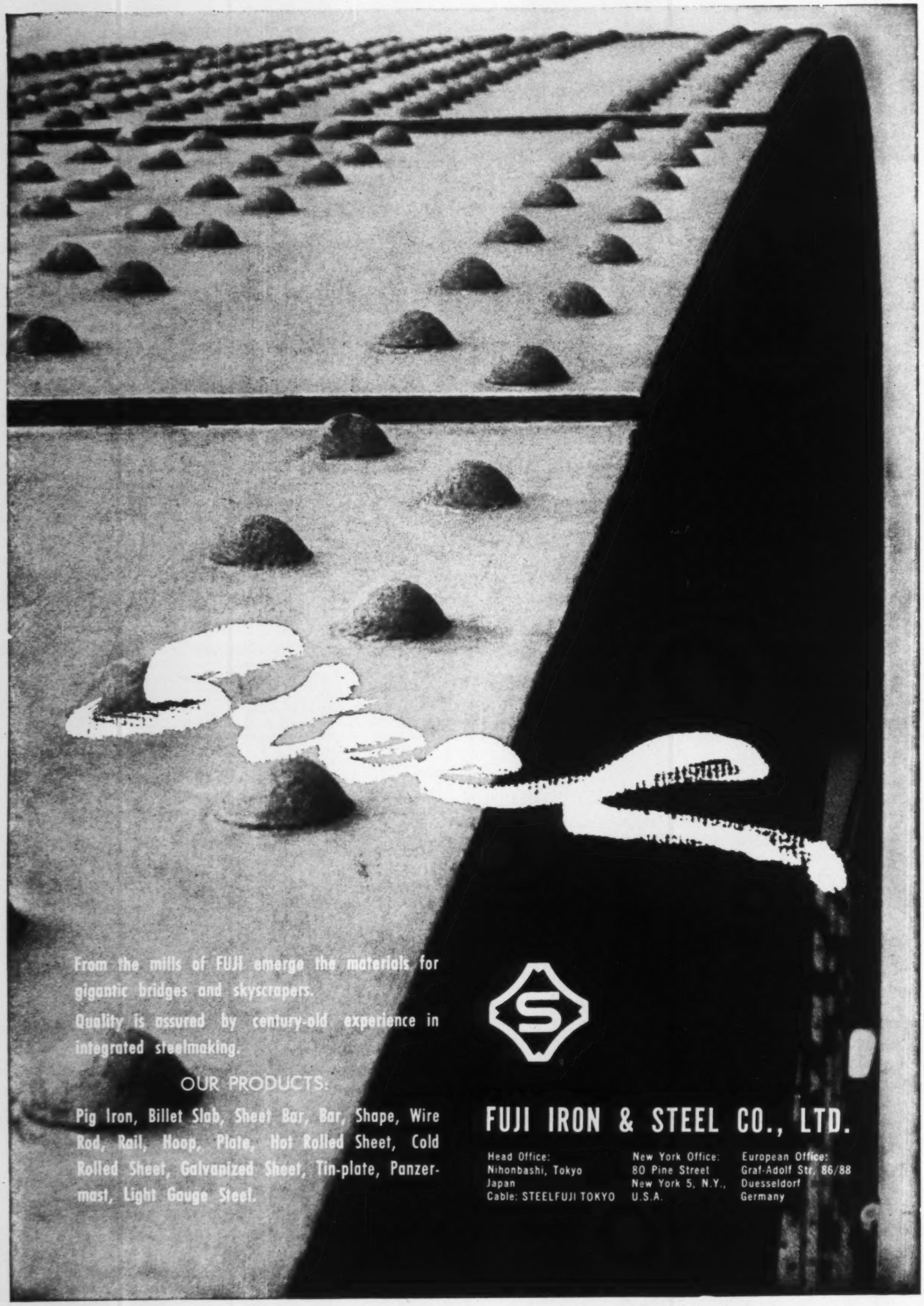
Next, there is thread grinding. The volume and nature of this operation dictates the use of a specially compounded thread-grinding oil. Gulfcut 41TG is used. This oil provides good finish, accurate tolerances, long wheel life. In addition, it contains an anti-foam agent and corrosion inhibitor—both important in circulating systems of thread-grinding machines.

"As a result," says Doy Stanley, General Foreman, Facilities, "we've been able to make notable purchasing economies. What's more, we've lowered over-all maintenance and production costs by lessening the risk of cutting oil misuse."

There's a right combination of Gulfcut oils to help cut your machining costs. For additional information call a Gulf Sales Engineer at your nearest Gulf office. Or write for Gulfcut literature. Gulf Oil Corporation, Dept. DM, Gulf Building, Houston 2, Texas.

GULF

SP 10196



From the mills of FUJI emerge the materials for gigantic bridges and skyscrapers.

Quality is assured by century-old experience in integrated steelmaking.

OUR PRODUCTS:

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New York 5, N.Y.,
U.S.A.

European Office:
Graf-Adolf Str. 86/88
Duesseldorf
Germany

COMING EXHIBITS

Chemical Industries Exposition—28th Annual, Nov. 27-Dec. 1, New York City Coliseum.

Canning Machinery & Supplies Show—Jan. 21-24, Americana Hotel, Bal Harbour, Fla. Assn. headquarters, 4630 Montgomery Ave., Washington.

MEETINGS

DECEMBER

Malleable Founders Society—Semi-annual meeting, Dec. 1, Hotel Sheraton-Cleveland, Cleveland. Society headquarters, 781 Union Commerce Bldg., Cleveland.

National Federation of Independent Scrap Yard Dealers, Inc.—8th annual convention, Dec. 1-3, Barbizon-Plaza Hotel, New York City.

American Institute of Chemical Engineers—54th annual meeting, Dec. 3-6, Hotel Commodore, New York. Institute headquarters, 25 W. 45th St., New York.

Electric Overhead Crane Institute—Annual meeting, Dec. 5, Carlton House, Pittsburgh, Pa.

Spring Manufacturers Assn.—Annual meeting, Dec. 5-6, Biltmore Hotel, New York. Assn. headquarters, Box 1440, Bristol, Conn.

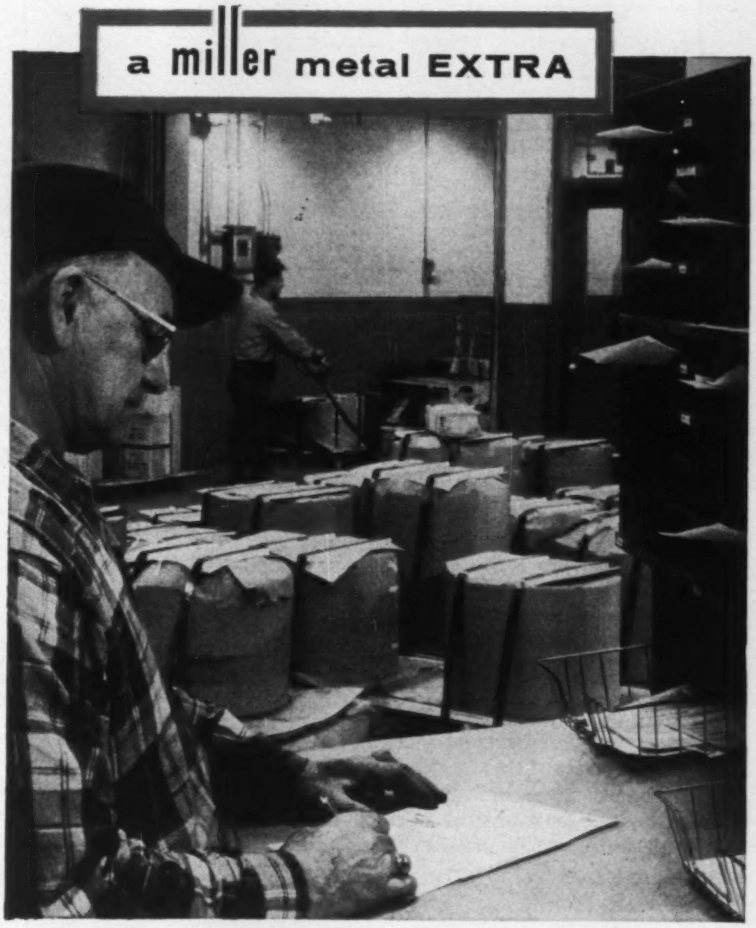
National Assn. of Manufacturers—Annual meeting, Dec. 5-7, Waldorf-Astoria Hotel, New York. Assn. headquarters, 2 E. 48th Street, New York 17.

American Ordnance Assn.—43rd annual industrial preparedness meeting, Dec. 6, Waldorf-Astoria Hotel, New York. Assn. headquarters, Mills Bldg., Washington, D. C.

Metallurgical Society of AIME—19th Electric furnace conference, Dec. 6-8, Penn-Sheraton Hotel, Pittsburgh.

Materials Research Conference—Rensselaer Polytechnic Institute, Dec. 18-19.

(Continued on P. 30)



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New Forging Idea News

How to Improve Parts Design with This Fresh Approach to Forging

Design Refinements suggested by COMMERCIAL's forging experts make many parts in use today better, more economical. Here are detailed examples of only three COMMERCIAL upset forgings which demonstrate how these design refinements have resulted in superior OEM parts at lowered cost.

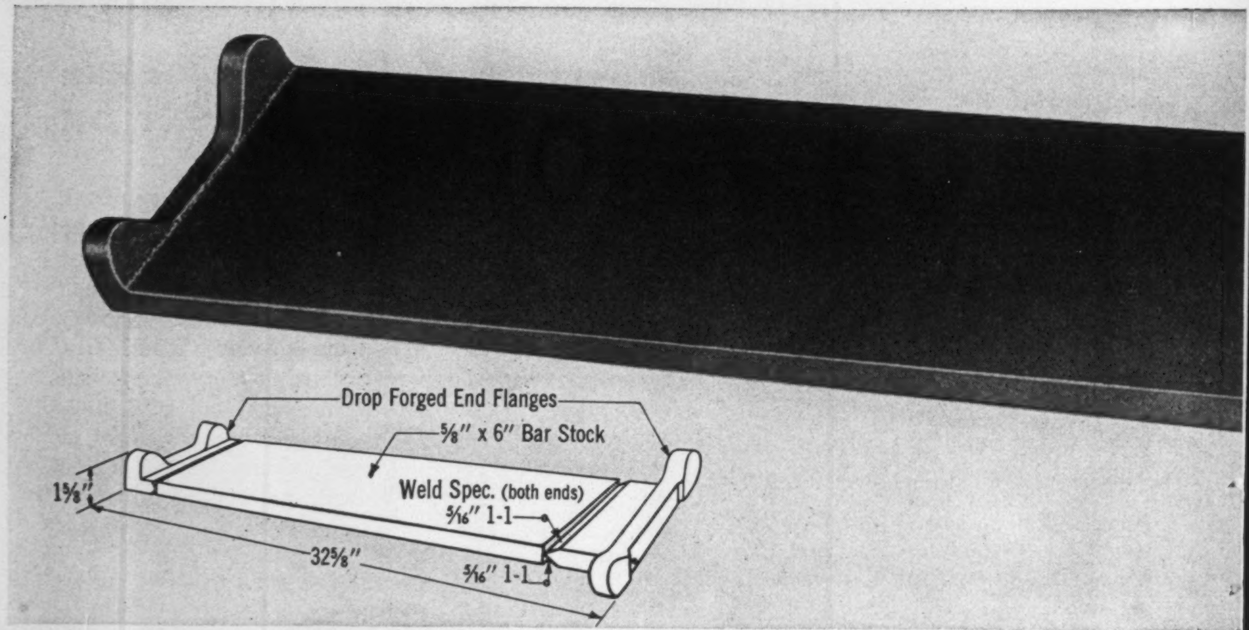
Quality Forgings start with "Forging Quality" rolled steel...closely controlled in its making to eliminate defects, to obtain surface and interior soundness, to refine grain structure into a directed fibrous flow. Upset Forgings in closed dies produces by squeeze pressure a "looped" grain flow and permits concentration of grain density at points where the service stresses are calculated to be the greatest. Also, control of the directioning of the inherent fiber-like structure provides for maximum strength of the metal at required stress points. Not only are the properties of the metal improved in all directions, but also the metal structure is refined and compressed resulting in a structural uniformity that renders the metal remarkably free from concealed defects. Result: Tough, strong part—free of hidden defects and surface flaws.

Advantages of Upset Forgings

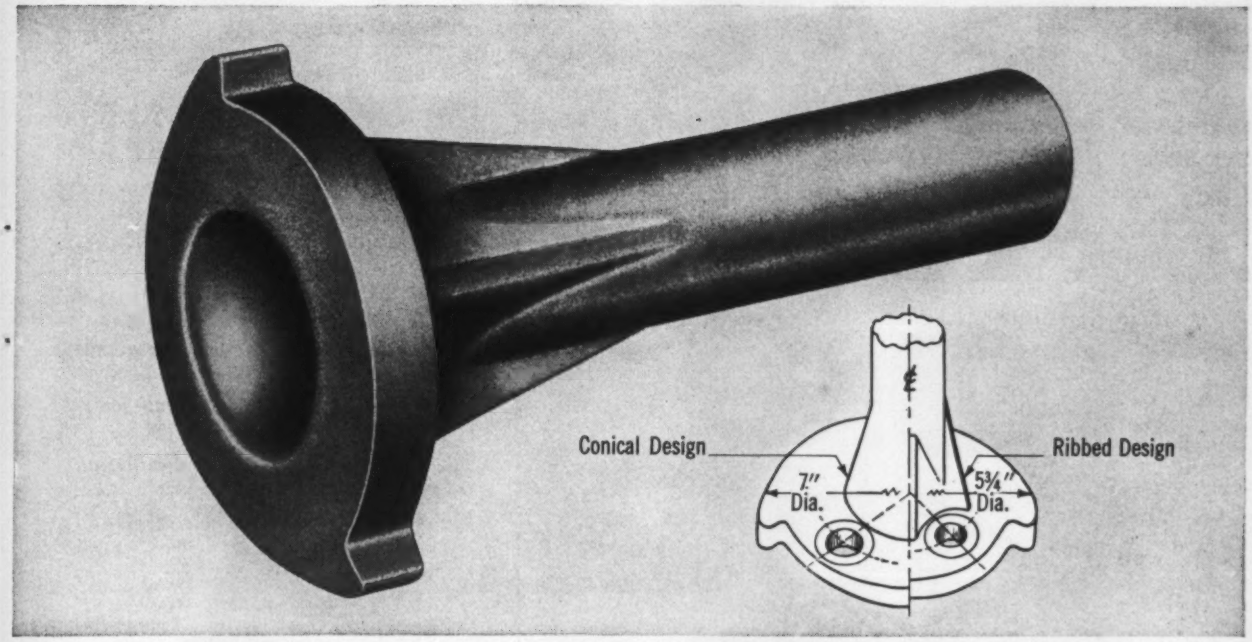
- *Uniform strength, toughness and high fatigue resistance insure longer, more dependable service life for equipment.*
- *Parts made closer to finished dimensions—cuts scrap, reduces machining and finishing time.*
- *Components can be assembled by simple production methods into complex parts.*
- *Uniform response to heat treatment gives desired physical properties of precise degree.*
- *Higher strength-to-weight ratio obtainable—a vital factor in the design complexity of parts for the future.*

Features of Upset Forging by COMMERCIAL

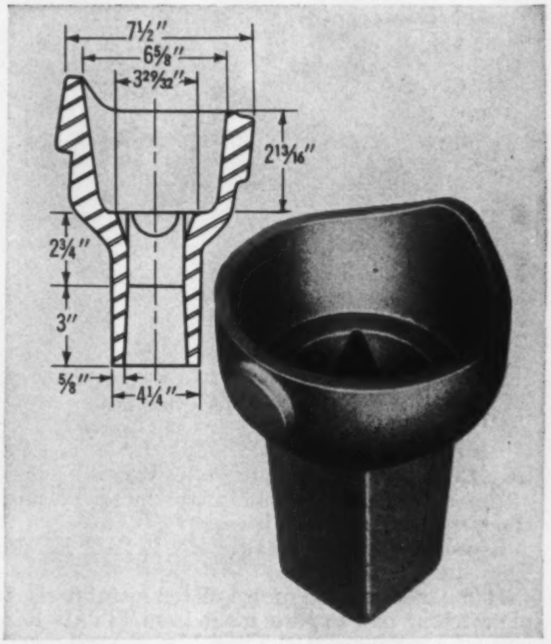
- *Batteries of upsetters from 1½" to 8"—custom or production runs.*
- *Hydra-Jet descaling prior to forging reduces imbedded surface scale.*
- *Magnetic particle depth inspection to detect metal faults before shipment.*
- *"Task Forging" team steeped with experience in producing the unusual upset forging.*



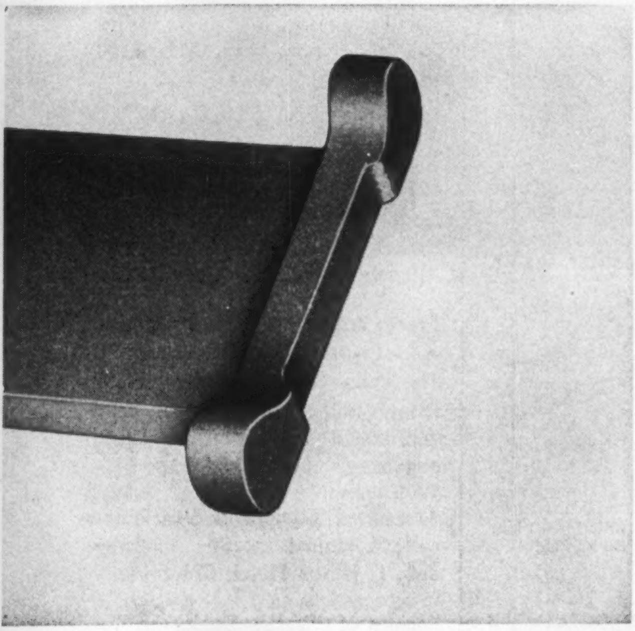
FORGING REPLACES WELDMENT—Structural side bar for agricultural tractor was formerly fabricated from ⅝" x 6" mill-edge bar stock and two drop forged end flanges. COMMERCIAL'S redesign called for a homogeneous "metal quality" upset forging. Controlled, fiber-like grain structure is concentrated at stress points. All welding and grinding is eliminated. Warpage disappeared and surfaces are smooth ready for final high lustre finish. Except for automated drilling of holes, now possible due to close tolerance forging, the part is ready for assembly line. Customer benefits have decisively proved the advantages of COMMERCIAL'S "Task Forging" team know-how.



FRESH APPROACH DESIGN SAVES 25%—Lower front end steel tractor spindle, if produced to conventional design, presented excessive weight problem. Symmetrical conical taper from shank to cam head called for 45 lbs. blank weight. COMMERCIAL produced the part to the ribbed taper design with 34 lbs. blank weight. Here is an excellent example where closed die forging most efficiently positions quality metal. Even the cam ears were upset to exact size and location. Result: Smaller part with ample strength, important cost benefits.



UNIQUE FORGING SUPPLANTS CASTING—Unusually shaped axle trunnion socket seemingly was a natural for casting because of asymmetrical trunnion end plus external boss. COMMERCIAL produced the part to finished size via closed dies in an 8″ upsetter. Metal had to be displaced both internally and externally. Result: Rejects cut way down, less machining, stronger part, weight reduced, metal saved.

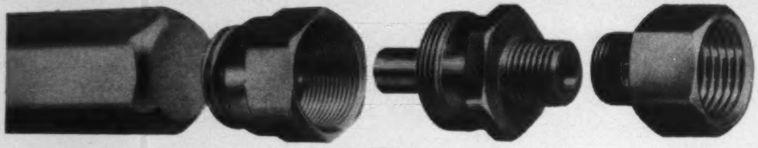


When its a vital part, design it to be **FORGED**

While designs are on the board, call on COMMERCIAL'S "Task Forging" team to collaborate with you. Many other ingenious solutions by COMMERCIAL to tough forging problems are detailed in Bulletin 600-P1. Write Commercial Shearing & Stamping Company, Dept. K-48, Youngstown 1, Ohio.

COMMERCIAL
shearing & stamping

BRASS PARTS



with RC Hex appeal

TRADEMARK

Design engineers like the appearance of brass parts machined from TITAN® *RC Hex* free-cutting brass rod.

Parts are plated with new ease and luster. It's because the six corners of *RC Hex* Rod are rounded! The parts achieve that "rounded" appeal . . . added to the durability of solid brass.

Hex corner plating buildup is reduced. Plating is smoother, faster, cheaper. Parts assembly is easier.

Especially in barrel plating do TITAN *RC Rex* Rod parts shine! They don't nick or burr.

If you machine rod or use plated metal parts, think of switching now to parts made from TITAN *RC Hex* Brass Rod. Your nearest Titan Man can tell you more. Call him. *RC Hex* Rods in over 40 sizes from 5/16" to 4¼" are shipped rapidly from distributors, and from Titan mill depots in Bellefonte, Pa.; Indianapolis, Ind.; Newark, Calif.

write for RC Hex die size list

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DIVISION OF CERRO CORPORATION
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RODS • FORGINGS • DIE CASTINGS • WELDING RODS • WIRE
Established 1915

MEETINGS

(Continued from p. 27)

JANUARY

Institute of Scrap Iron & Steel—Annual convention, Jan. 14-17, Statler-Hilton Hotel, Washington. Institute headquarters, 1729 H St., N.W., Washington.

Assn. of Consulting Management Engineers, Inc.—Annual business meeting, Jan. 15, University Club, New York. Assn. headquarters, 347 Madison Ave., New York.

Mining Symposium—University of Minnesota and Minnesota Section, AIME, joint meeting, Jan. 15-17, Duluth Hotel, Duluth, Minn.

Compressed Gas Assn. — Annual meeting, Jan. 15-17, Waldorf-Astoria Hotel, New York. Assn. headquarters, 500 Fifth Ave., New York.

Steel Plate Fabricators Assn.—Annual meeting, Jan. 15-19, Mountain Shadows Hotel, Scottsdale, Ariz. Assn. headquarters, 105 W. Madison St., Chicago.

Aluminum Assn.—Annual meeting, Jan. 24-26, New York. Assn. headquarters, 420 Lexington Ave., New York.

American Sprocket Chain Manufacturers Assn.—Annual meeting, Jan. 25-26, Drake Hotel, Chicago. Assn. headquarters, 819 South Aldine Ave., Park Ridge, Ill.

Truck Trailer Manufacturers Assn.—21st Annual convention, Jan. 28-31, Palm Springs Riviera Hotel, Palm Springs, Calif. Assn. headquarters, 710 Albee Bldg., Washington.

Associated Equipment Distributors—43rd annual meeting, Jan. 28-Feb. 1, Hilton Hotel, Chicago.

Society of Plastics Engineers, Inc.—Annual technical conference, Jan. 30 - Feb. 2, Penn - Sheraton Hotel, Pittsburgh. Institute headquarters, 65 Prospect St., Stamford, Conn.

COOPER BESSEMER

Edmund J. Haar, Chief Engineer of Compressor Plant, Thatcher Glass Mfg. Co., Streator, Illinois, and his new FM-2 compressor.

When you bank on compressed air...

Take a look at an operation that *really* depends on air. At Thatcher Glass Manufacturing Co., Streator, Illinois, compressed air plays vital roles. It supplies process air for glass blowing. It powers practically all of their expensive machines and handling equipment. Reliable air pressure is a *must.*

In a recent expansion of its compressed air plant, Thatcher decided on the new Cooper-Bessemer 600 hp FM-2 compressor shown above. This is one of the fine quality M-Line Series featuring "natural force balance" and recognized everywhere for dependable, low-maintenance performance.

Whatever you make . . . when you want compressed air for processing or power, it will pay you to investigate the Cooper-Bessemer M-Line Compressors. Call our nearest office.

Cooper-Bessemer

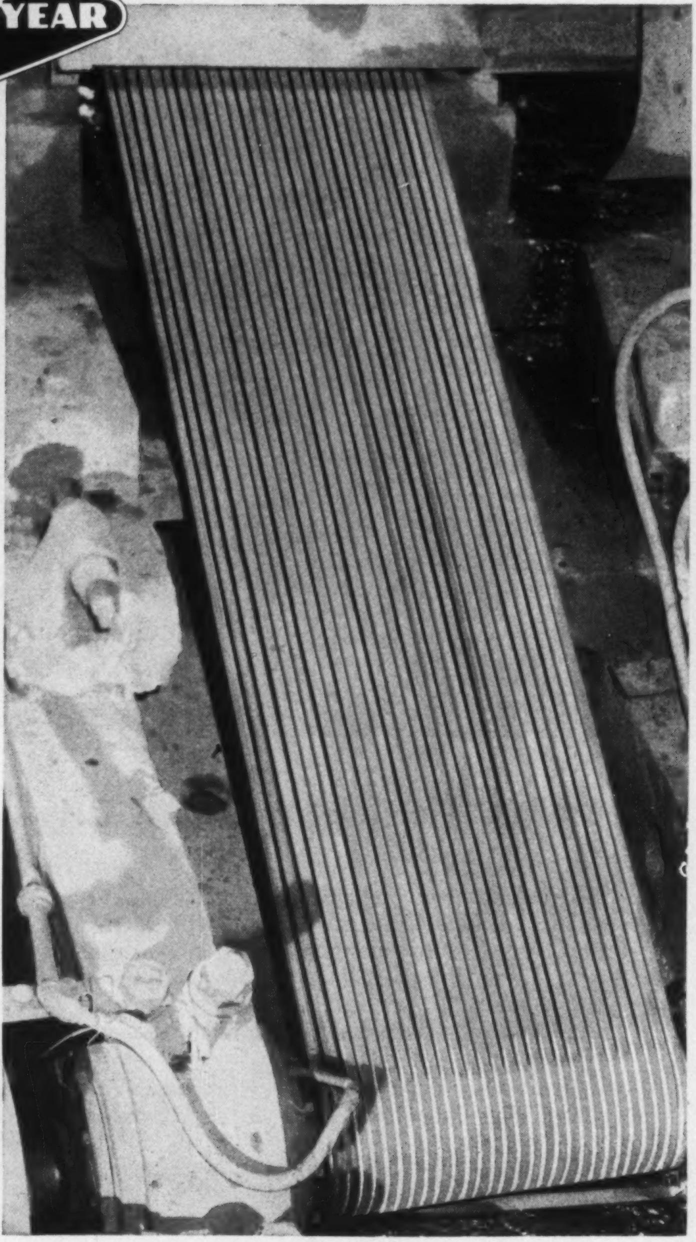
GENERAL OFFICES: MOUNT VERNON, OHIO

COMPRESSORS: RECIPROCATING AND CENTRIFUGAL
ENGINES: GAS · DIESEL · DUAL-FUEL
JET-POWERED GAS TURBINES

GOODYEAR EXCLUSIVE! IS YOUR SIGN OF V-

GOODYEAR

Goodyear V-Belts' precision matching comes from this exclusive close-tolerance matching equipment that length-codes each belt to 1/32". Most other belt manufacturers code only to 1/10".



Goodyear V-Belts' precision matching assures standout performance. Example: only 28 COMPASS-V-Steel Belts handle this big steel saw, normally calling for 42 belts. Result: the steel mill saved $500 at the original installation – will save more at every belt change.

THE GREEN SEAL BELTS CODED TO 1/32"

Here's your assurance that every belt in a set matches in length–pulls together for maximum trouble-free horsepower hours

What's more, the Green Seal means–

Dimensional stability that lasts the life of the belt–thanks to shrink- and stretch-resistant "muscles" of 3-T Process Cord or airplane-type steel cable built into each belt.

Satisfactory performance even when subjected to dampness – because of special mildew-inhibited compounds.

The most complete line of V-Belts anywhere today – always within easy reach through a nationwide network of distributor stocks.

The proper selection of V-Belts to meet your requirements with the help of the G.T.M.– Goodyear Technical Man – America's top belting specialist.

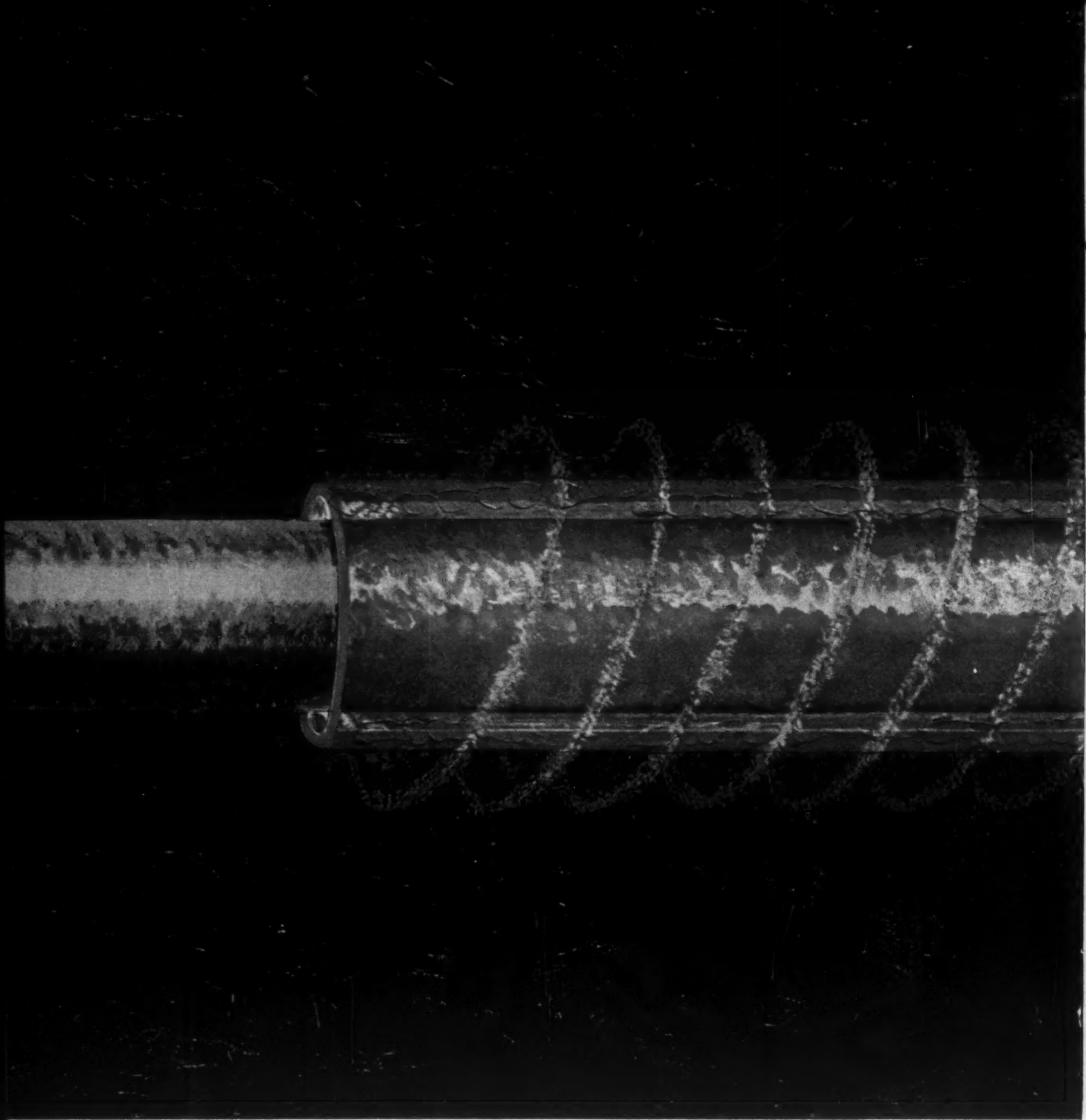
So make the GREEN SEAL your sign of savings–in both time and money–by calling your Goodyear Distributor. Or write Goodyear, Industrial Products Division, Akron 16, Ohio.

Lots of good things come from

GOODYEAR

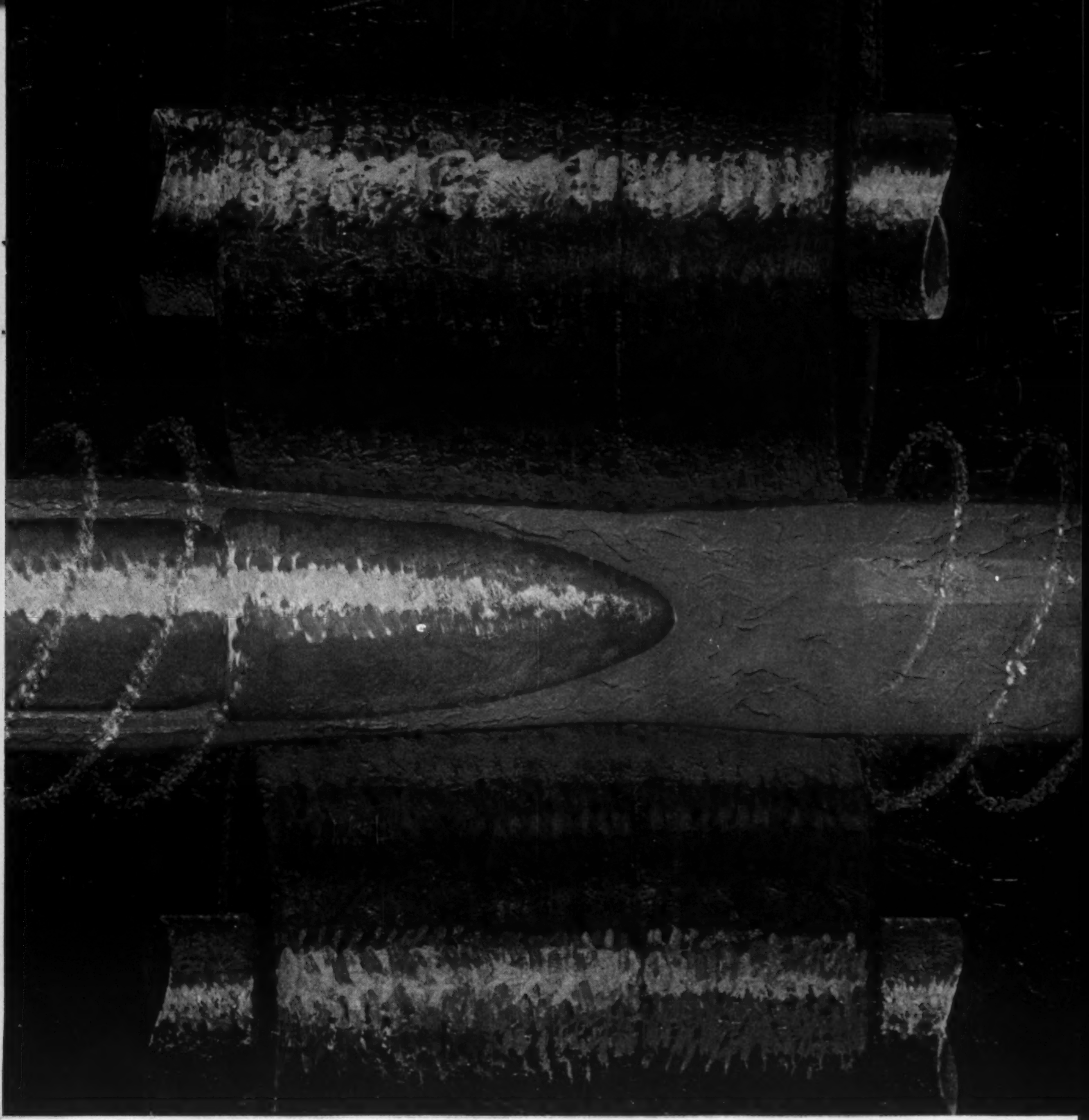
INDUSTRIAL PRODUCTS

Green Seal, Compass–T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio



Remember the good old ways

This mark tells you a product is made of modern, dependable Steel.



The piercing operation is one of the first steps in creating seamless pipe or tubing from a solid section of steel. After we set the hot steel billet in place, we ram it. Spin it. Push its insides out. And stretch it into a hollow many times longer than the original piece of steel.

There's nothing new about making seamless tubular products this way—we've been doing it for 70 years. This doesn't mean that we're old-fashioned—but sometimes the old ways are best. Whether we use an old established method or a revolutionary new one, whatever is the best way to make pipe or tubing is how National Tube makes it.

USS is a registered trademark

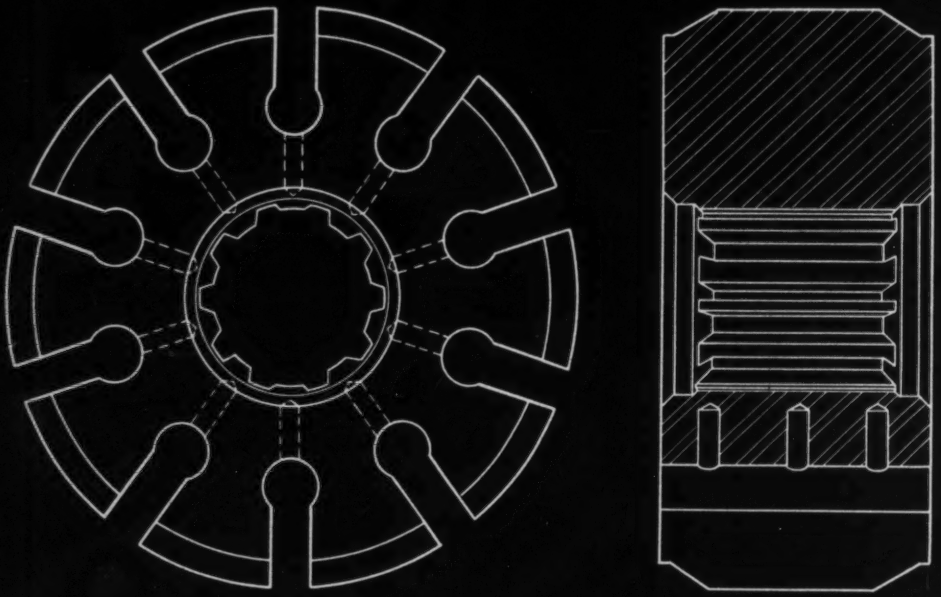
USS

**National Tube
Division of
United States Steel**

Columbia-Geneva Steel Division, San Francisco,
Pacific Coast Distributors
United States Steel Export Company, New York

At Denison — $30,343.50

This is the part:



VANE TYPE HYDRAULIC PUMP ROTOR machined from a 4150 steel forging. Operation: Broaching splines and vane slots. Tolerances: .001" before grinding.

Denison Engineering Division, American Brake Shoe Company, makes a broad line of precision hydraulic presses, pumps and controls. Cost of tool change down time on three vertical broaches was high. Denison turned to Mobil for help.

Mobil recommended use of its new Mobilmet 27 cutting oil. Down time was reduced over 30% . . . 44.5% fewer tool grinds were needed . . . with five-figure savings any plant would welcome.

Mobilmet 27 is a unique cutting oil. Its pressure-temperature-selective additive composition was developed and patented by Mobil. We know that even in a single cutting operation, pressures, temperatures and other conditions can vary widely. Mobilmet oils have an inbuilt ability to adapt to these variables. They have given a new and really broad meaning to the words multi-range, multi-metal, etc.

Mobilmet 27 keeps tools sharp far longer, with substantial savings. Hard, brittle and draggy metals of many kinds are machined to close tolerances, often with no subsequent finishing operation. Speeds and feeds can often be increased with fewer tool grinds. Staining problems are minimized.

Look into these remarkable Mobilmet oils. You can get details quickly from your Mobil Representative or by writing to: Mobil Oil Company, 150 East 42nd Street, New York 17, New York.

Vernon Smith, Assistant Plant Engineer (at right), and Mobil Representative H. M. Lamb inspect vane pump rotor at Denison's Delaware, Ohio plant.

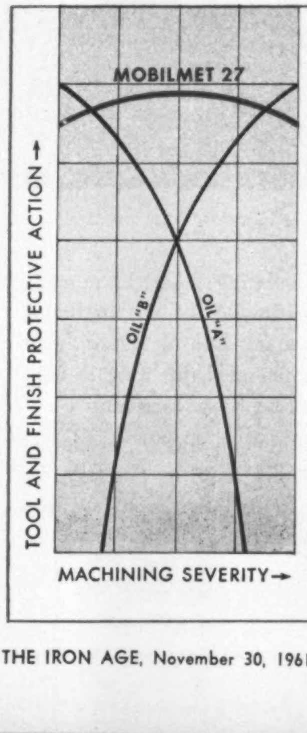
saved with Mobil® help

These are the savings:

$24,606 saved in production time. Yearly tool change down time on Denison's three broaches was 1,333.2 hrs., valued at $40 an hour—$53,328 yearly. Using Mobilmet 27 this cost was cut to $36,924, saving $16,404 annually—$24,606 for the 18-month period of use.

$5,737.50 saved in tool grinding. Broach strings formerly required 165 tool grinds yearly for the three machines. With Mobilmet 27, only 114 tool grinds were needed yearly. Thus, Denison saves 51 tool grinds yearly at $75 each—$3,825 a year, $5,737.50 for 18 months.

When the right cutting oil can save $30,343.50, finding that oil is mighty important. Denison found this oil in Mobilmet 27 for broaching slots to .001" tolerances in vane pump rotors that deliver up to 2,000 psi.



MOBILMET 27 with pressure-temperature-selective additive action guards tools . . . speeds work . . . improves finishes.

Mobilmet 27 has a unique ability to handle many metals—many machining conditions, as symbolized here. Red line indicates how Mobilmet 27's tool and finish protective action bridges *both* the conditions met by single-purpose, low-activity oil (A), single-purpose, high-activity oil (B), *and all conditions between.*

The reason: a revolutionary patented additive composition that is pressure-temperature-selective in its action. On tough, draggy steels, Mobilmet 27 has high additive activity, *controlling* built-up edge . . . permits high cutting speeds, assures superior finish and minimum tool wear. And on hard but clean-cutting metals, Mobilmet 27 has low additive activity, *permitting* formation of a proper protective built-up edge . . . allows high cutting speeds, minimizes wear on lip and cutting edge of tool.

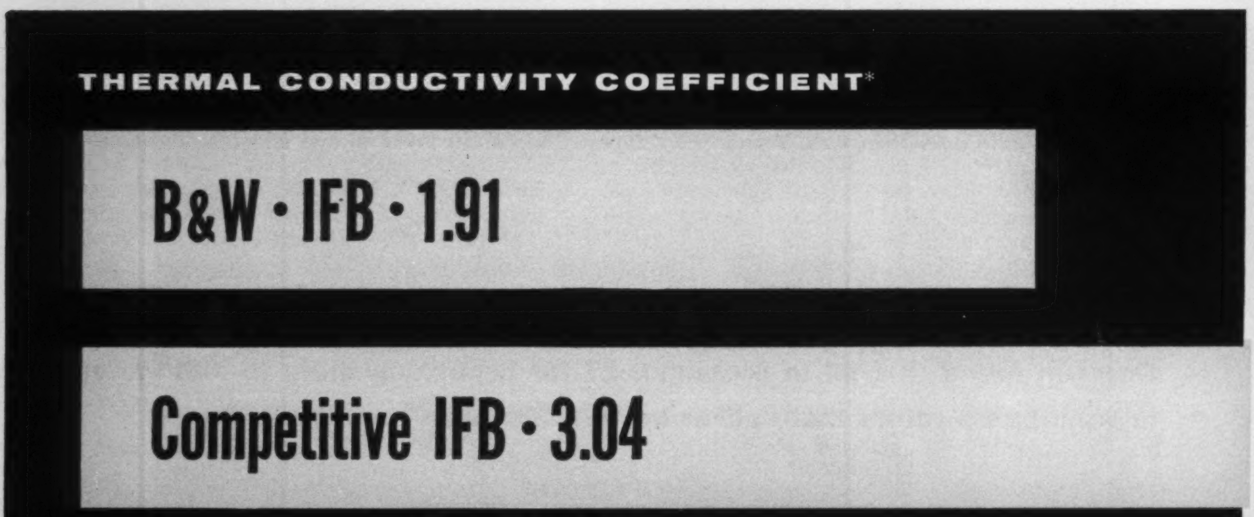
One oil replaces many . . . tools stay sharp . . . tool grinds are fewer . . . output is increased . . . tolerances and finishes are improved . . . unit costs are reduced.

Mobil

MOBIL OIL COMPANY
150 East 42nd Street
New York 17, N.Y.

Another *plus* of Lightweight B&W Insulating Firebrick

LOWER THERMAL CONDUCTIVITY means



NOTE: The above chart, based on available published figures, compares the difference in thermal conductivity between lightweight B&W IFB and the average of seven other leading insulating firebrick. This example, specifically covering 2300 F use limit insulating firebrick, is representative of the low conductivity of B&W IFB at all temperature levels.

*BTU/SQ. FT./IN. THICKNESS/HR./DEG. F.

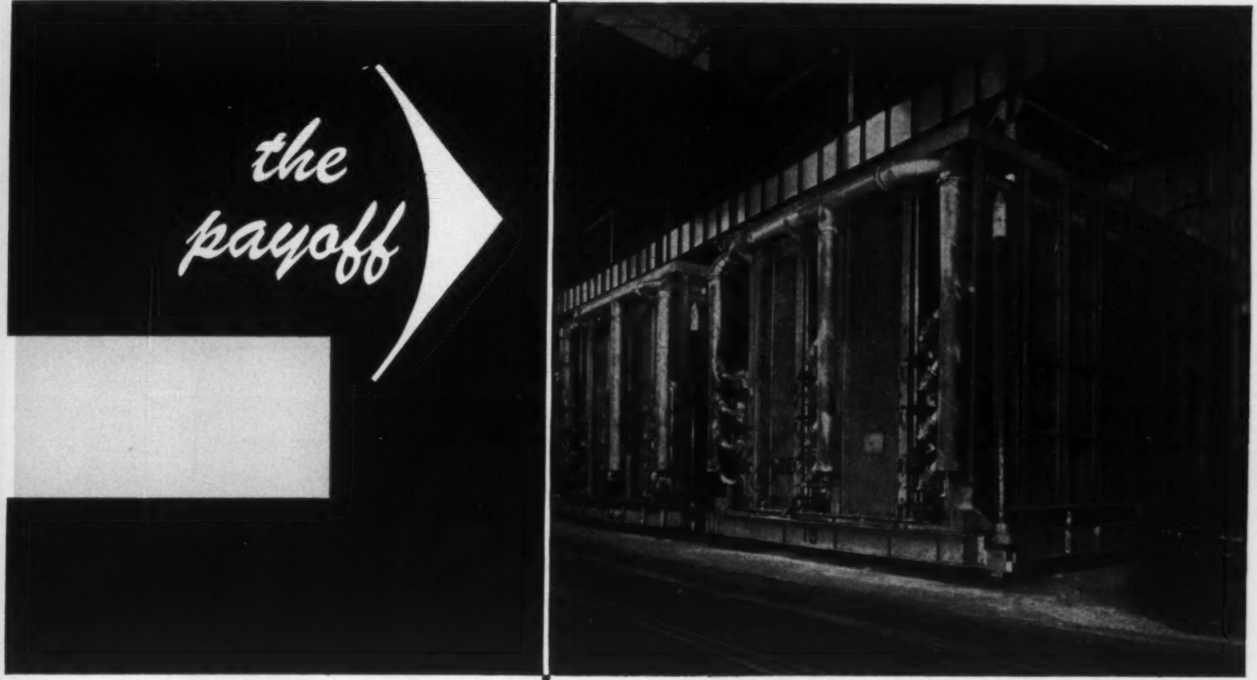
All insulating firebrick are not the same. Published figures show wide variations in *all* of the important properties among the leading brands of IFB.

Take thermal conductivity. This important property affects fuel costs, temperature control and the speed with which a furnace heats and cools. Thermal conductivities range from a B&W low of 1.91 to a high of 3.47 for a competitive IFB—*almost a 100% difference in wasted heat and fuel costs.*

You are paying for insulating firebrick . . . make sure you get *all* the benefits. B&W—the originator of IFB—manufactures a full line of IFB with an experience-proved balance of light weight, high insulating value, high strength and long life.

For complete information on B&W Insulating Firebrick, write for Catalog R-38 to The Babcock & Wilcox Company, Refractories Division, 161 East 42nd Street, New York 17, N. Y.

LOWER FUEL COSTS



- **14% lower fuel costs • 30 F lower casing temperature**
- **25% less time to reach operating temperature • 12 hours saved per cycle**

These are the results of a direct comparison of two furnaces of the type shown above, one lined with B&W IFB and the other with one of the better competitive insulating firebrick. That's how B&W pays off for a major steel company in their 8-stack, hood type, strip annealing furnaces. This is just one of many proofs in our files that "there is an important difference in insulating firebrick."

B&W

R-658

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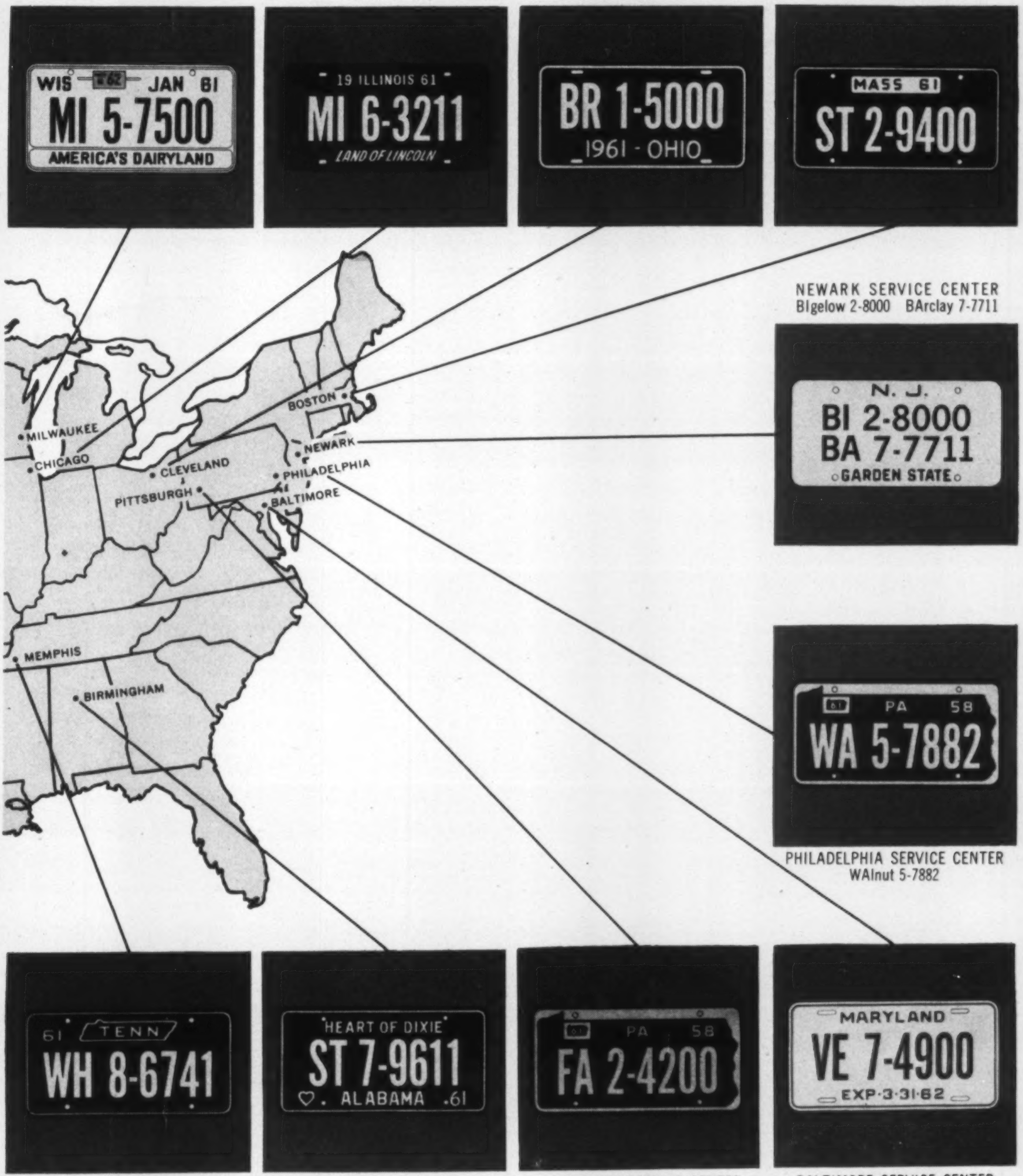
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MI 5-7500
AMERICA'S DAIRYLAND
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MI 6-3211
LAND OF LINCOLN
BR 1-5000
1961 - OHIO
MASS 61
ST 2-9400
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BI 2-8000
BA 7-7711
GARDEN STATE
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WA 5-7882
61 TENN
WH 8-6741
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If you have *anything* to do with plant

take a good look at

Chances are you can get better lubrication... and save money in the bargain

To many people grease is an unglamorous and confusing subject. This is a shame, because grease is really a spectacular sort of lubricant. Nevertheless, people who don't understand it tend to forget it.

As a result, they run into all sorts of trouble. Sometimes they spend too much, buy the wrong thing, or misapply what they do buy. Sometimes they neglect to apply it at all.

True, a few years back, greases could be a headache, principally because in many cases the "right" grease simply didn't exist. To handle some of the tougher jobs grease-makers came up with the weirdest sort of concoctions. No wonder people put grease in the product-to-be-forgotten class.

But times have changed.

Grease-makers have found out a lot. They're making *better* products . . . and Sun's among the leaders in producing a full line of modern maintenance greases.

WHAT IS A GREASE?

It always pays to be sure you know what you're talking about. At least, asking such an academic question may bring to light some worthwhile points you've forgotten. Simply, a grease is a thickened oil. By his choice of thickener, a grease-maker can make a grease with high resistance to water, to high temperatures, or to both. By using additives and inhibitors he can get certain special properties, such as tackiness, high resistance to deterioration, and so on.

You might think of the thickener as a sponge that sops up oil, thus providing a means of keeping an oil *on the job*.

Greases come into their own wherever it's hard to keep oil where it belongs, or where it's impracticable to keep replacing oil that runs away.

You can't make a good grease with crankcase drainings. You must *start* with a very carefully chosen high-quality oil. The better oil makes the better grease.

WHAT MAINTENANCE GREASES ARE AVAILABLE?

There are several principal types: The work horses, made with calcium and sodium soaps, and the glamour greases, usually made with lithium soaps, and sometimes with other soaps or other kinds of thickeners.

Most greases come in several consistencies, or "thicknesses". How they stack up is best explained in the simple chart below.

WHAT ABOUT A SINGLE MULTIPURPOSE GREASE?

Despite what you may have been told, there is no such product. That is, there is no *single* consistency of a *single* type of grease that can handle *every* operating condition. This is the unvarnished truth.

		Handle Water?	OK For High Temperatures?	What Speeds & Loads?	Relative Cost
THE WORK HORSES	Calcium Soap Grease	YES	NO	ANY	LOW
	Sodium Soap Grease	NO	YES	ANY	LOW
THE GLAMOUR GREASES	Lithium Soap Greases & Others	YES	YES	ANY	HIGH

lubrication . . .

what's happened to grease

HOW TO MAKE UP YOUR OWN MIND

You're in luck here. Modern greasemakers are just as eager as you are to cash in on simplicity. So they're cutting down the number of greases they offer, and this makes grease selection simpler for you.

You can start yourself on the way to grease modernization by asking yourself just a few easy questions:

What do I want the most?

- Good lubrication?
- The economy of simplification?
- The economy of low initial costs?
- Or some combination of these?

Of course you want good lubrication. And this is *always* available, because today, somebody, somewhere, has the grease that will stand up to whatever working conditions you've got to handle. The grease you need exists.

So now you're down to the remaining questions: Simplification? Low initial cost? Or a combination? The chart at the bottom of this page tells the story.

HOW MUCH SIMPLIFICATION?

Sometimes you can simplify yourself into spending *more* money, not less. Just the same, most people buy too many greases.

Many plants can do quite well with a single maintenance grease. This is hard for many people to believe. But it can be done, economically, in an amazing number of plants. Yours may be one of these. Many plants, of course, need two or three greases, but rarely any more.

When you're simplifying, the trick's in knowing when to stop.

THE VITAL LAST STEP

Now . . . you need to go only one step farther: You need to find *products* that will handle *your* needs.

And you need *savvy*, to analyze your needs, to pick the best product mix, and to apply wisely the products you buy.

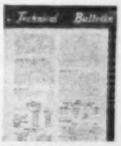
Again the answer's simple. Sun has the *products* and the *savvy*. If you're really interested in getting the most out of grease, your Sun man can help you. Call him. Put the challenge to him. Call him today and tell him that you want to talk grease.

TECHNICAL BULLETIN

If you're not disposed to talk, then you should ask for Sun's new Technical Bulletin 69. It gives complete information on all of the basic types of maintenance greases in a comprehensive, orderly fashion, and lists full details on the major greases Sun makes.

For your copy write to:

SUN OIL COMPANY, Dept. IA-11, 1608 WALNUT STREET, PHILADELPHIA 3, PENNSYLVANIA. In Canada: Sun Oil Company Limited, Toronto and Montreal. Or call the Sun representative located nearest you.



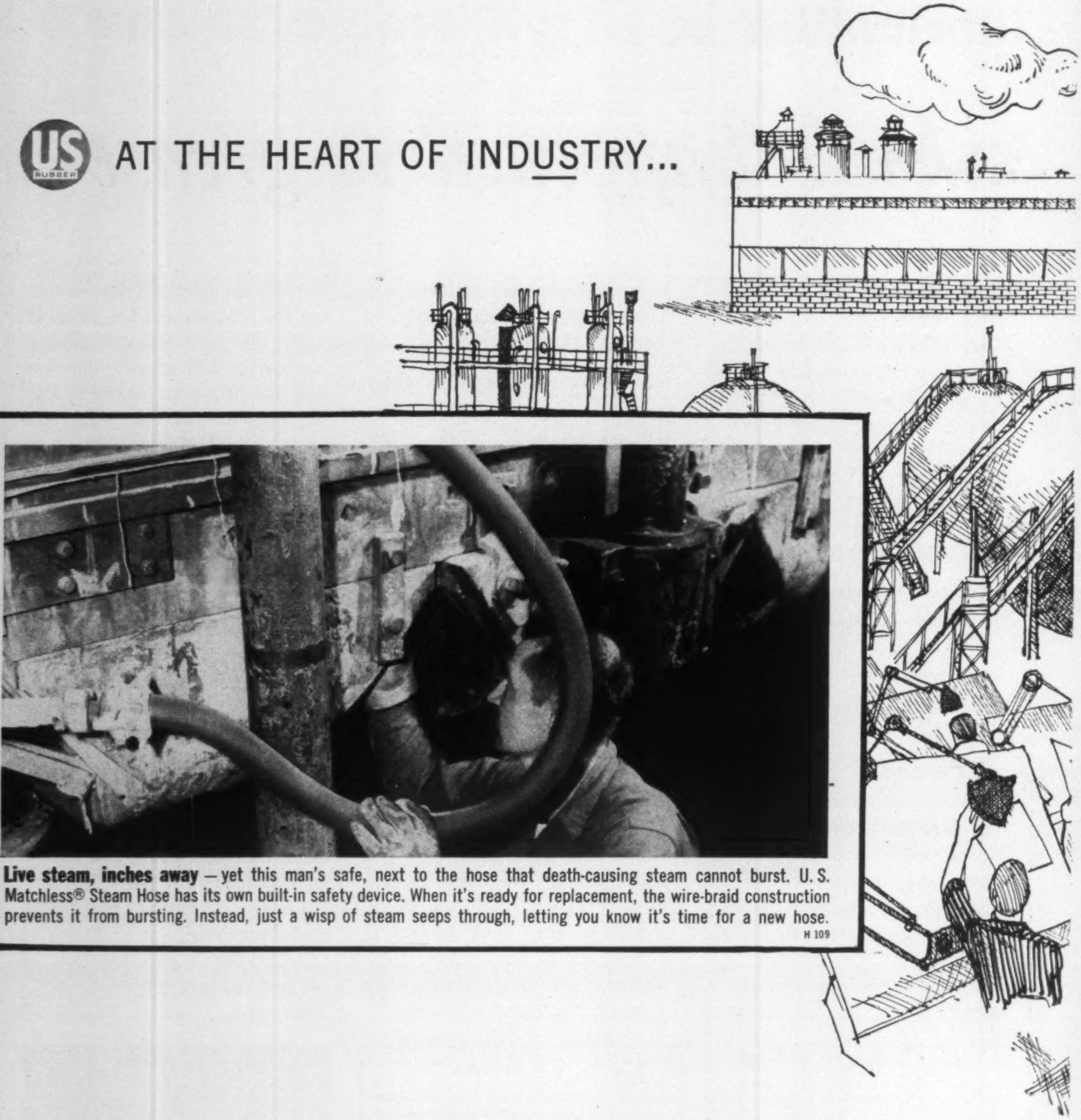
	Relative Grease Costs	Storage & Handling Costs	Chances of Failure Through Misapplication	REMARKS
Simplification?	HIGH	LOW	LOWEST	Usually, you'll need a glamour grease or two, and this will increase grease costs. This is not necessarily true in plants with narrow ranges of operating conditions or where you don't **need** one grease to handle, for example, high temperatures **and** water. In these cases you can often achieve simplicity by using one or two modern calcium or sodium greases in place of half a dozen.
Low initial costs?	LOW	HIGH	HIGHEST	When you have no condition that **requires** glamour greases, you can use moderate-cost calcium and sodium greases. This keeps grease costs down, but they can be overbalanced by higher storage and handling costs. Failures from misapplication are also more likely.
Combination of simplification and low initial cost?	MODERATE	MODERATE	MODERATE	Just about always the best solution. The bigger the plant, the more varied the needs, the more important a compromise becomes. Of the three, this is the hardest course to chart; to follow it wisely, expert advice is a must.

SUNOCO

Quality . . .

THE BEST ECONOMY OF ALL

AT THE HEART OF INDUSTRY...



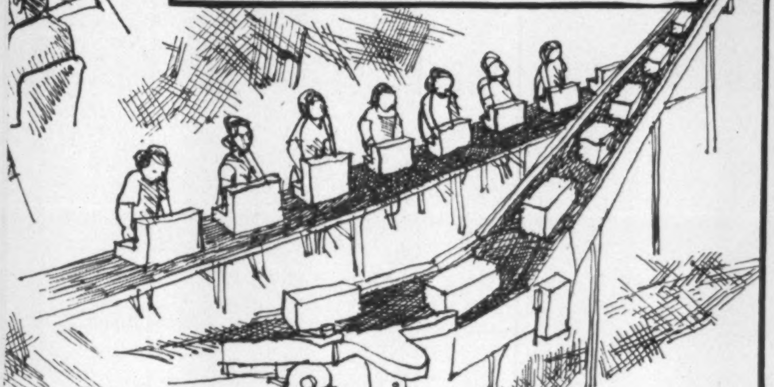
Live steam, inches away — yet this man's safe, next to the hose that death-causing steam cannot burst. U. S. Matchless® Steam Hose has its own built-in safety device. When it's ready for replacement, the wire-braid construction prevents it from bursting. Instead, just a wisp of steam seeps through, letting you know it's time for a new hose.

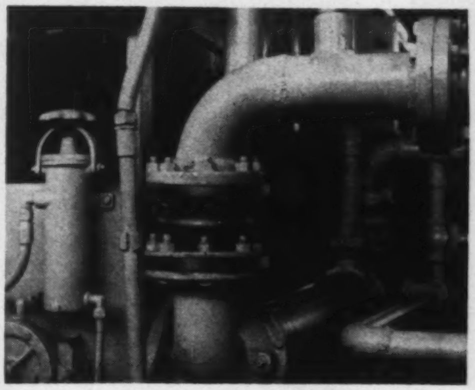
H 109

Leaders of industry maintain high standards with the help of US Industrial Rubber Products. These valuable production tools combine all the qualities industry demands—proven efficiency, faithful performance and minimum maintenance. No wonder US is the world's largest producer of industrial rubber products.

A murderous combination meets its master in this leading Southern foundry as U.S. FoundryGiant RipStop Conveyor Belts withstand hot foundry sand loaded with jagged pieces of cherry-red tramp iron . . . last 8 times longer than other belts. Special internal wire ribs prevent jagged pieces of metal flash, sprues, gates, and other abrasive material from tearing and wrecking the belt.

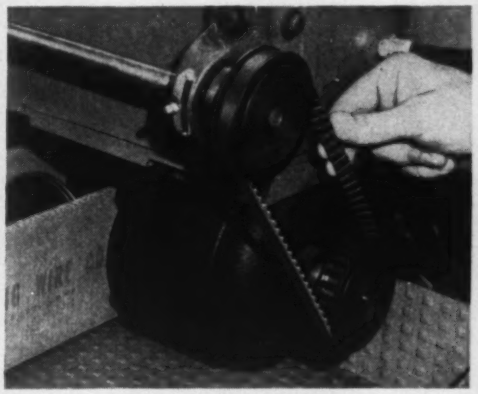
CB 114





Absorbing expansion and contraction forces before they can damage piping and equipment, tough US Expansion Joints compensate for misalignment and soak up vibration as well. Their ability to contain pressures, to serve as a permanent, maintenance-free part of the piping system is indicated by the fact that they are often painted over with the rest of the equipment.

EJ 102



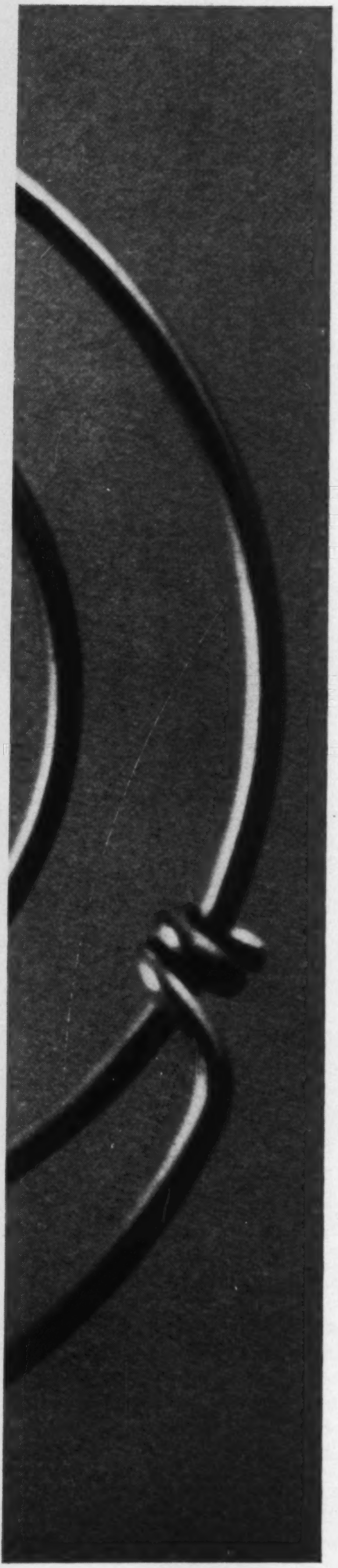
Because uniform speed is the need, Viking Wire Company uses US PowerGrip "Timing"® Belts exclusively on its wire-drawing machinery. These maintenance-free, noiseless belts are used in two critical production steps for enameled wire. They permit a constant long-length draw of wire through forming dies, and close speed control in enameling ovens.

TB 111

For every industrial rubber product need, turn to US. For Conveyor Belts, V-Belts, the original PowerGrip "Timing"® Belt, Flexible Couplings, Mountings, Fenders, Hose and Packings . . . custom-designed rubber products of every description. Discover why U.S. Rubber has become the largest developer and producer of industrial rubber products in the world. See your U.S. Rubber Distributor or contact US directly at Rockefeller Center, New York 20, N. Y.

WORLD'S LARGEST MANUFACTURER
OF INDUSTRIAL RUBBER PRODUCTS

United States Rubber
MECHANICAL GOODS DIVISION



Steel

. . . serves you every day
in a thousand ways

Here's a real sleeping beauty!

We're talking about the wire in the bed spring at left. It's Gamma Spring Wire—the sworn enemy of the kind of insomnia caused by lumpy mattresses. This quality wire, one of the many types manufactured by CF&I, has the resiliency and shape-retention characteristics that help produce more comfortable, longer lasting bedding and furniture springs.

CF&I's Gamma Spring Wire can be tailor-made to stop spring-coiling problems *before* they begin. If, for example, you use electrical stress-relieving units in your automatic coiling and knotting operations, we can supply Gamma Spring Wire with a special finish to prevent electrical arcing. And for applications that subject wire to severe crimping and clinching, there is a Gamma Spring Wire to meet your requirements.

A CF&I engineer will be happy to study your operation and recommend the type of wire that will do the best job at lowest cost. Call your nearby CF&I sales office for complete details.

Other CF&I Upholstery Wires include Round High and Low Carbon Wire for borders and braces, No-Sag Furniture Wire, and Zig-Zag Spring Wire for car upholstery.

8533

The Colorado Fuel and Iron Corporation
Denver • Oakland • New York
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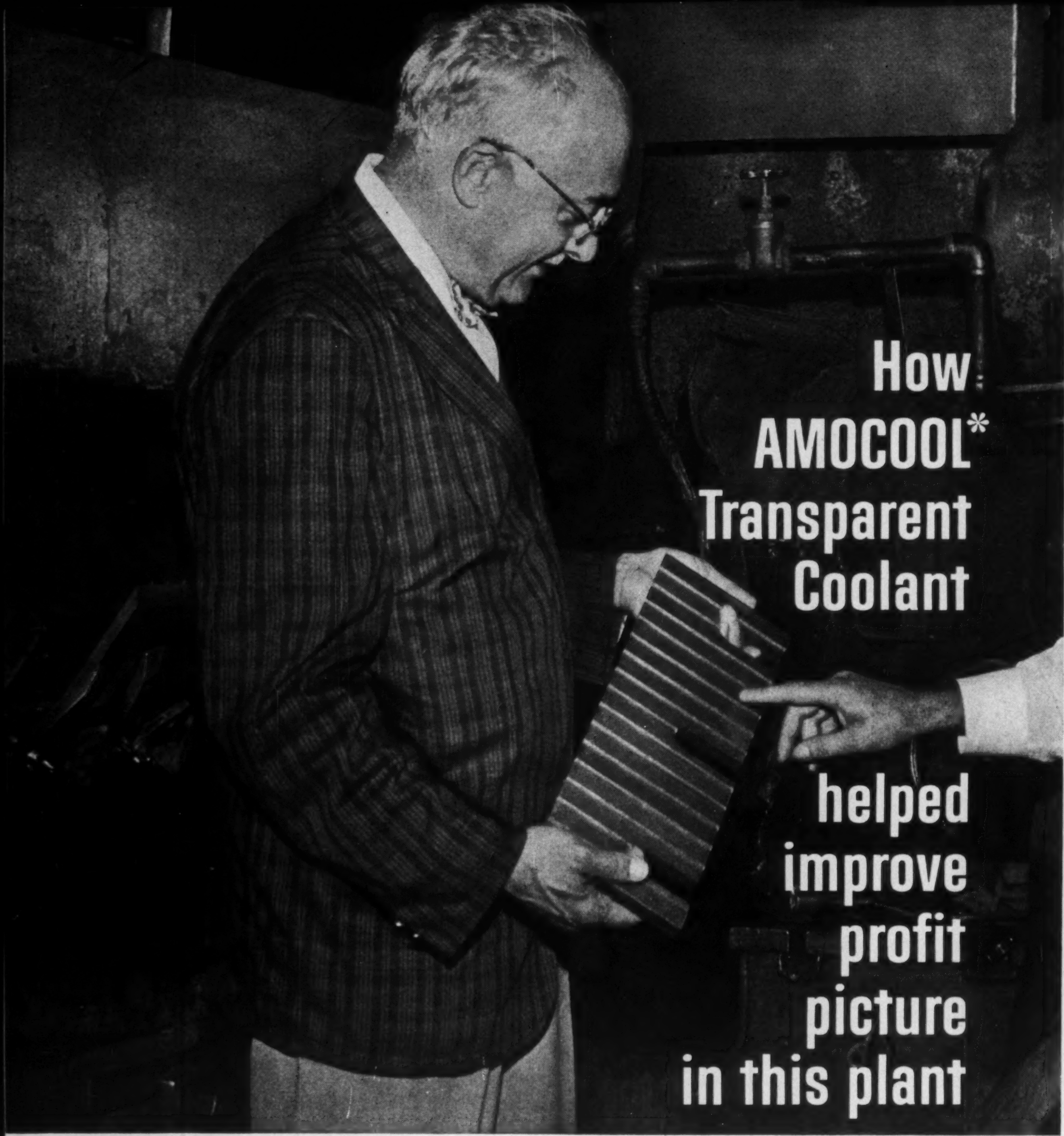
CF&I
STEEL
MADE IN U.S.A.



How AMOCOOL* Transparent Coolant helped improve profit picture in this plant

*Trademark

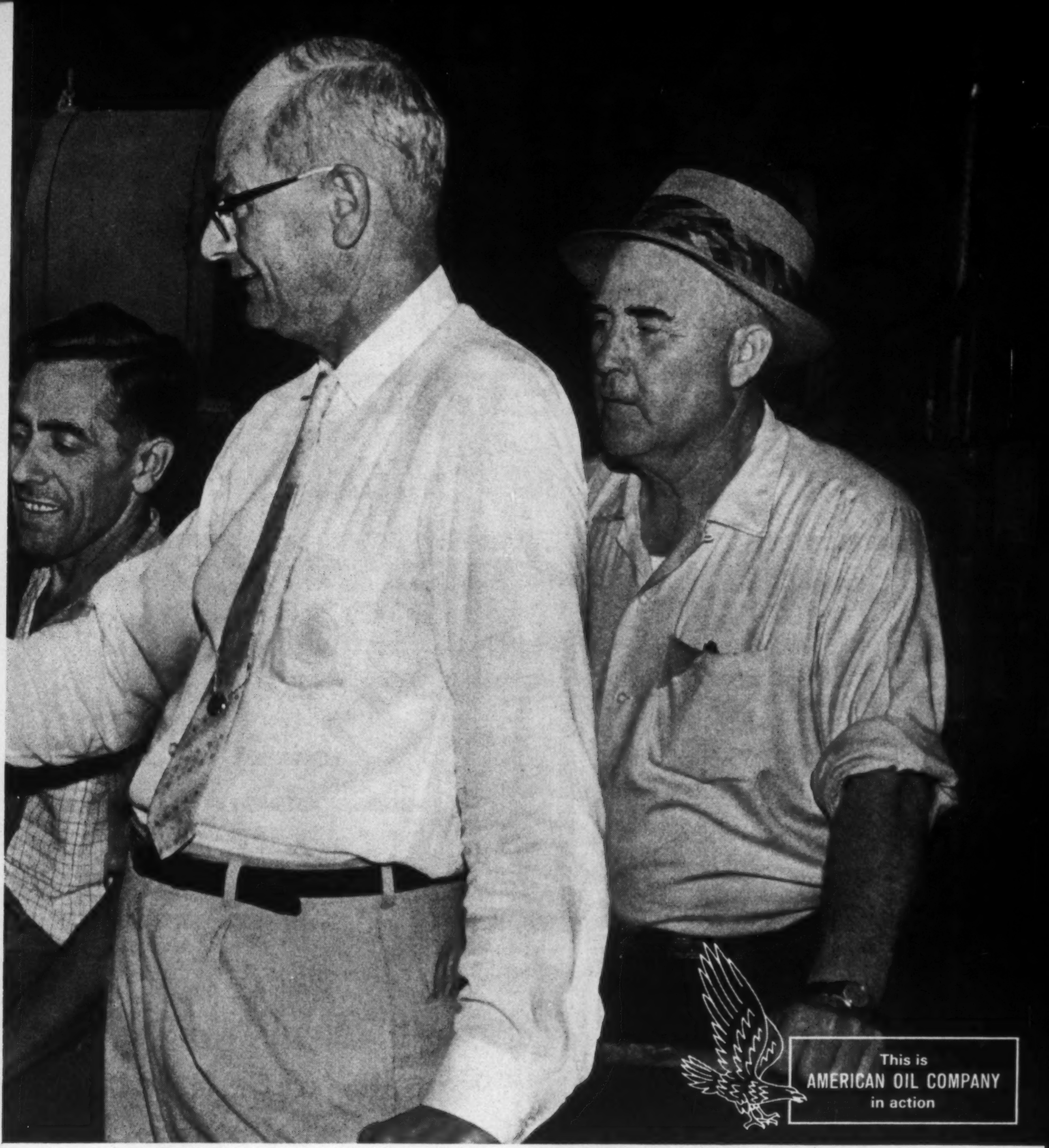
BY PAUL E. "PAPPY" STRATTON

About the Author. "Pappy" Stratton has been providing technical help on lubrication and metalworking problems to customers in the Detroit area for nearly all of the twenty-five years he has been working for the company. In addition to having this store of practical experience to help him, Pappy has completed the Company's Sales Engineering School.

* * *

By using a soap-base grinding compound, Detroit Edge Tool Company was getting excessive corrosion and rust on work and grinding machines. Oil vapor was collecting on machines and on the ceiling, causing dirty working conditions. Most important, high wheel loading was causing frequent down-time for wheel dressings.

We worked out a test program on AMOCOOL Transparent Coolant with the management. On our first test on one surface grinder, feed pressure was cut substantially while at the same time metal removal was increased.



This is
AMERICAN OIL COMPANY
in action

Eliminate reworking because of rust, reduce wheel loading and extend intervals between wheel dressings; do these and you increase profit per unit, explains Detroit Edge Tool president, Dan Ebbing, to P. E. "Pappy" Stratton of American Oil. Plant manager, John Yonker (right) and Sam Vineh, operator, look on.

The cost of reworking parts to remove rust was eliminated. Time required to clean machines to get rid of the odor was cut in half. Less wheel loading and fewer wheel dressings have upped production and reduced costs. Our test program paid out in an improved profit picture. All grinding and drilling equipment has been converted to AMOCOOL Transparent Coolant.

* * *

Would you like this kind of technical help to assist you in improving profits? Get it by calling the American Oil Company office nearest you.

Quick facts about
AMOCOOL
Transparent Coolant

- Clear, transparent fluid
- Controls corrosion on work and machines
- All chemical. Does not support bacteria growth
- Unaffected by humidity
- Fire resistant
- Odorless

AMERICAN

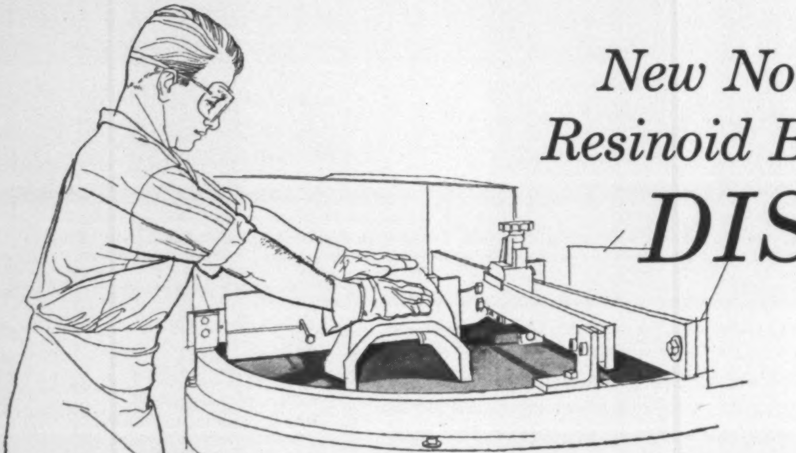
AMERICAN OIL COMPANY
910 South Michigan Avenue
Chicago 80, Illinois

Profit by the big advantage plant after plant is already using . . .

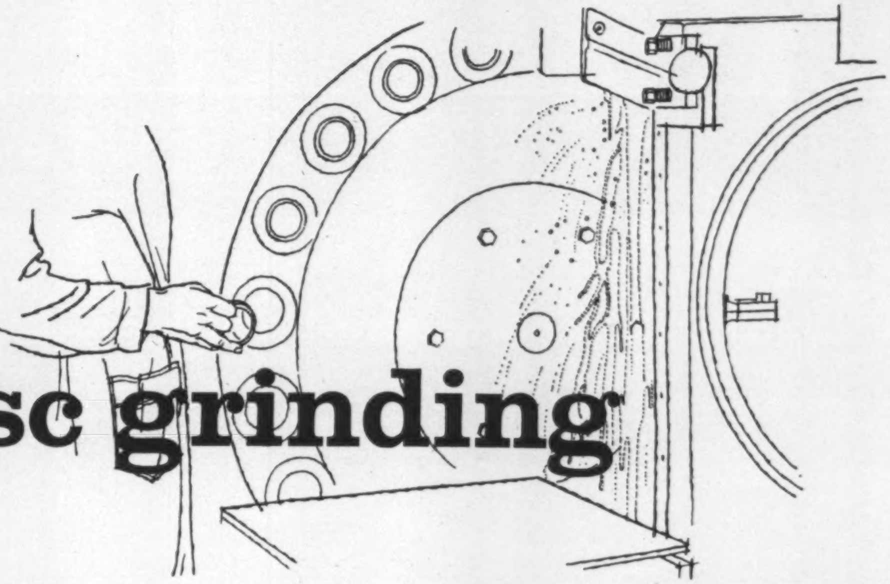
Hit that new high in

with

B14



New Norton Resinoid Bonded ***DISCS***



disc grinding

Throughout the country plant after plant is showing real enthusiasm for the new economy — and profits — the Norton-developed B14 resinoid bond has brought to the finest disc wheels ever made.

Development of the new B14 bond involved not only improvements in bond material but entirely new processing.

It took several years to perfect these changes. It also took many months to complete nationwide testing of the new B14 discs, on all types of disc grinders — horizontal or vertical spindle, single or double — on jobs ranging from snagging to precision finishing, and on ferrous, non-ferrous and non-metallic materials. Also, the tests were entirely comparative — not only against competitive wheels but against Norton discs which were then standard.

Results of this across-the-board testing are outstanding. The new B14 discs have proved beyond question their ability to grind more workpieces per disc . . . faster and better, with fewer dressings . . . and with constant uniformity throughout extra long disc life.

Let new B14 discs bring you proof of better lower cost surfacing. Have your Norton Man, a trained abrasive specialist, study your requirements and make trial runs of the B14's you need — solid discs or segmental, ALUNDUM* or CRYSTOLON* abrasive. Or get details from your Norton Distributor. NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

*Trade-Marks Reg. U.S. Pat. Off. and Foreign Countries

A few of very many reports from Norton customers . . .
PROVING B14 DISCS THE BEST

JOB: Rough grinding iron castings, 3½" x 2½".

REPORT: **B14 37 CRYSTOLON wheel ground 6,000 parts with one dressing. Best previous disc gave 4,500 parts with 4 dressings.**

JOB: Surfacing cold rolled steel washers on double disc machine.

REPORT: **B14 19 ALUNDUM discs impressive as best so far, with very even wear.**

JOB: Through-feed grinding of 52,100 steel bearing races.

REPORT: **B14 ALUNDUM disc very free cutting, clean and cool. Longer life than previously used Norton disc.**

JOB: Double-disc grinding Alnico magnets.

REPORT: **B14 mixed-abrasive wheel thoroughly approved for new orders.**

JOB: Double-disc grinding abrasive sticks.

REPORT: **B14 37 CRYSTOLON disc gave improved rate of cut. More abrasive sticks per disc-dressing.**

JOB: Rough grinding miscellaneous parts on double end machine.

REPORT: **B14 44 ALUNDUM disc performed better, lasted longer than all types.**

NORTON
ABRASIVES

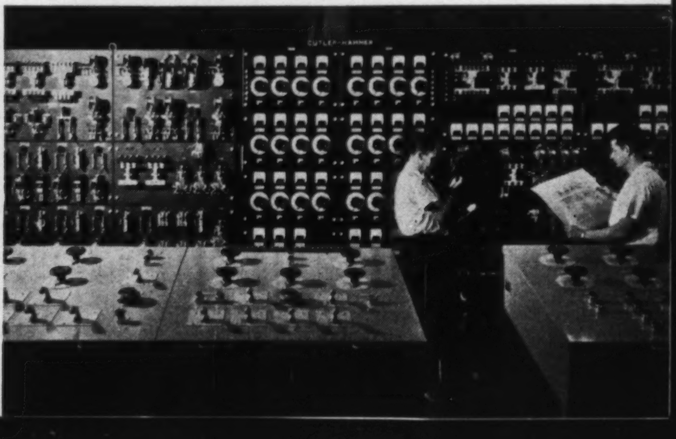
W-2009

Making better products . . . to make your products better

NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Non-Slip Floors — BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes

Call in the C-H man early! Broad experience in all phases of systems control design means the Cutler-Hammer man brings a knowledgeable eye to your particular control problems. Whether your requirements call for a unique solution, as this Granite City job did, or a more standardized system, call Cutler-Hammer.

Cutler-Hammer Test Floor. Here, complete factory tests of systems control prior to shipment insure faster installation, more trouble-free start-ups. Analog computer-simulator can test engineering solutions before construction; simulate response of any motor or machine to aid in actual factory tests.



CH
CONTROL

What's new in systems control?

New Cutler-Hammer synchro tower position control smooths operation of Granite City tinning line

New approach provides stepless tower movement, cuts maintenance required by older systems

Stepless control over the entire range of tower movement is provided for the first time in the steel industry by Cutler-Hammer. In addition, a continuous visual indication of the exact looper position is always available to the operator.

Both entry and exit towers of the tinning line at Granite City Steel Company in St. Louis utilize this new synchro control.

Less Maintenance

Synchro control eliminates the steps, and greatly reduces the amount of maintenance commonly associated with photoelectric tower control systems. Results? Better control, smoother operation of entry and exit sections, which is echoed in better control of the tinning and cleaning section and of the entire line.

The tinning section is where accurate and synchronized speed regulation provided by the systems control engineer contributes to obtaining the ultimate in tin coated strip.

The complex array of continuous process equipment on the Granite City line is driven by 85 D-c motors totalling 1044 hp and is powered by 13 D-c generators. These 98 rotating machines are tied together by a control system which includes 15 static type regulators to insure superior line performance.

Among the reasons for recent Cutler-Hammer achievements in continuous process control is a standard factory pretest procedure, plus an analog computer-simulator that can help engineers test solutions before construction. *You get more benefits when you call in your Cutler-Hammer systems man early in your planning.*

What's new at Cutler-Hammer?

Recent leadership in tinning line control is matched by other Cutler-Hammer systems automation in dozens of continuous process lines. Look for more "firsts" from Cutler-Hammer . . . we've geared up with new production facilities, new engineering talent . . . a *new desire* to help the primary metals industry meet the challenge of the sixties! Call in your Cutler-Hammer man early in your planning.

WHAT'S NEW? ASK...

CUTLER-HAMMER

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. • Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.

CH
CONTROL

You pick the winner every time...

...with Vancoram Ferrochromium Alloys!

For gleaming stainless, rugged constructional steels, or alloy cast irons and steels, you can choose exactly the right chromium alloy from the complete Vancoram line. Every popular composition of chromium and chromium-silicon alloy is available for essentially unlimited selection to fulfill your particular requirements. These alloys include EXLO® (extra-low-carbon with high chromium:carbon ratio) . . . and an entire family of high-carbon chromium alloys.

Vancoram chromium alloys always provide the absolute cleanliness and uniformity steelmakers and foundrymen need. Your VCA Representative will be happy to help you select the alloy compositions exactly right for you. Write, wire or phone your nearest VCA District Office. Vanadium Corporation of America, 420 Lexington Avenue, New York 17, N. Y. · Chicago · Cleveland · Detroit · Pittsburgh

VANADIUM
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Producers of alloys, metals and chemicals

VANCORAM

DoALL
BAND SAW BLADE
THE DoALL COMPANY

a DoALL PRODUCTIVITY-PLUS product

new Dart® Blade guaranteed to cut your cost per cut on any machine—or your money back!

Try it for results like these!

NOW AVAILABLE in widths, pitches, and types for every job.

Dart Precision®

3/16, 1/4, 3/8, 1/2, 5/8, 3/4, and 1-in. blade in 6, 8, 10, 12, 14, 18, 24 and 32-pitch, depending on width; raker or wave set.

Dart Buttress®

3/16, 1/4, 3/8, 1/2, 3/4, and 1-in. blades in 3, 4, and 6-pitch, depending on width.

Dart Claw Tooth®

1/4, 3/8, 1/2, 3/4, and 1-in. blade in 3, 4, and 6-pitch, depending on width.

Special introductory offer: a free lubricator for your horizontal cutoff saws with an order of 12 Dart blades and one gal. #150 cutting oil.

"**. . . cannot afford to be without Dart blade.** Initial increased investment of 10% is returned fourfold"—Zuelzke Tool & Engineering, Milwaukee.

"**200% increase in blade life;** rate of cutting increased 10%; accuracy greatly improved"—The Eldred Company, Columbus, Ohio.

"**Dart blade on our horizontal saw** has been running over a month and still like new; never before able to use any carbon blade for two weeks . . . getting straighter cuts; longer life; no messy coolant splash with lubricator you installed"—Embassy Metal Corporation, New York City.

"**Your claim of 50 to 75%** greater blade life is conservative. Cutting 2½" pipe, Dart outlasts two regular blades"—Minneapolis Ornamental Iron Company, Minneapolis.

"**Blade life one and a half and two times** previous. Straighter cuts eliminate scrap loss and secondary operation"—Vickery Engineering Company, Indianapolis.

Dart cuts cost per cut on any vertical or horizontal machine. Call your local DoALL store today for a demonstration.

THE DoALL COMPANY, Des Plaines, Illinois
Serving you locally through your DoALL Sales-Service Store

DoALL . . . the Productivity People

SB-89

*Reg. T.M.—The DoALL Company

CALL YOUR DoALL SALES-SERVICE STORE

MACHINE TOOLS

Price $10,336
Model 2613-3
Rent $66.21 per week
Contour-matic*
23 types
BAND MACHINES

Price $1475
Model DH-612
6" x 12"
Rent $9.46 per week
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GAGE BLOCKS
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Price $265
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All sizes, grades

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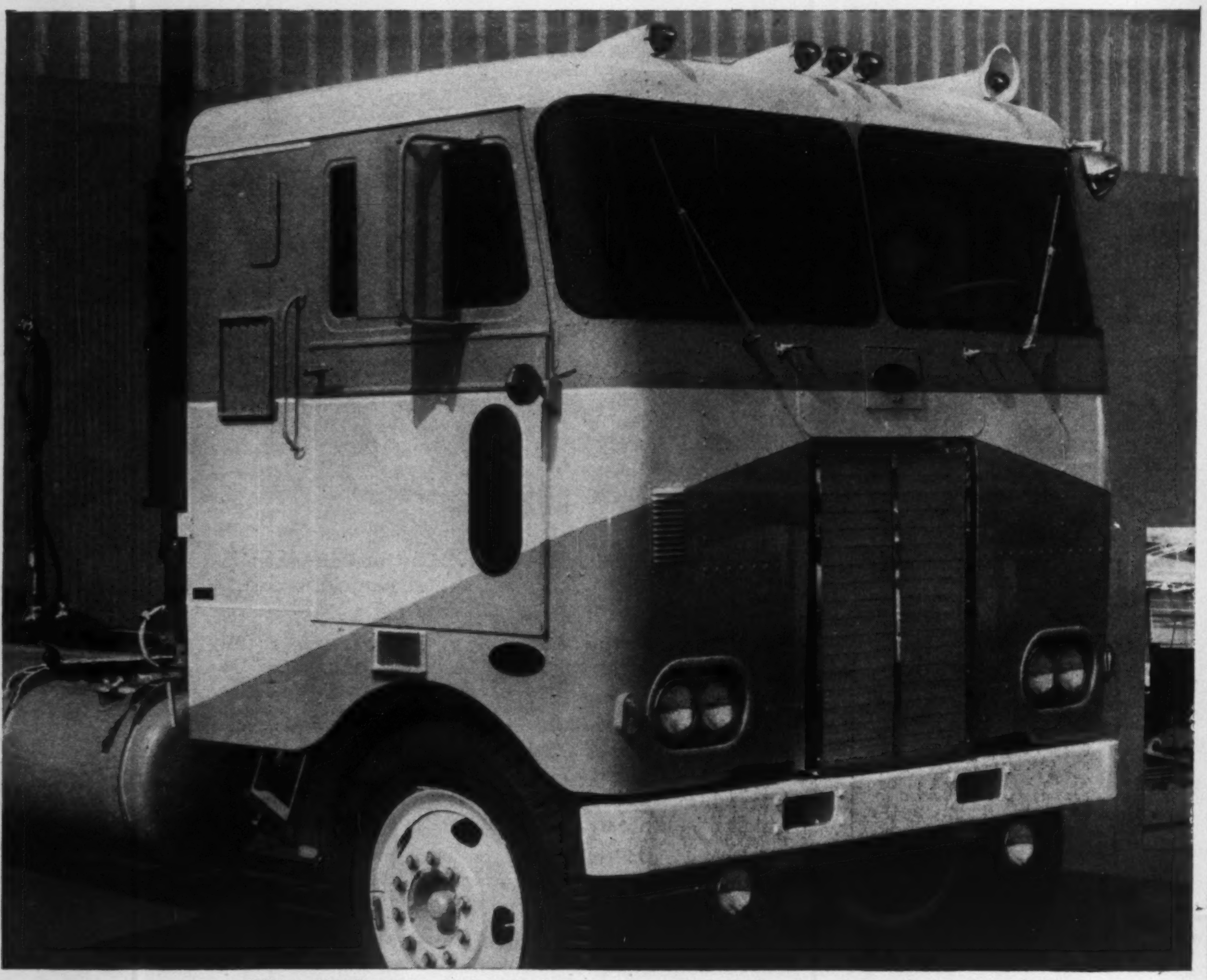
CUTTING FLUIDS
DoALL TOOL AND DIE STEEL

For Every Purpose
2,000 Sizes • grades

Find Your DoALL STORE In The "Yellow Pages"

Take a lead from the leaders...

Entire Plant Built Treating Processes at



"'Way Ahead"—in tilt-cabs, in off-the-highway heavy duty trucks, in custom features sums up Peterbilt performance. Adding more durability to these quality vehicles are Amchem chemicals for superior metal protection.

Around Amchem Metal Peterbilt Motors

Mr. Don F. Pennell, Peterbilt General Manager

"WITH ALODINE* AND GRANODINE** WE CLEAN, PREPARE AND PAINT MORE PARTS BETTER AND FASTER THAN WITH ANY OTHER PREVIOUS METHOD USED."

At Peterbilt Motors, Newark, California, a combination Alodine and Granodine dip system for both aluminum and steel cleaning and paint preparation has provided this major truck tractor manufacturer with production features which translate into end product advantages.

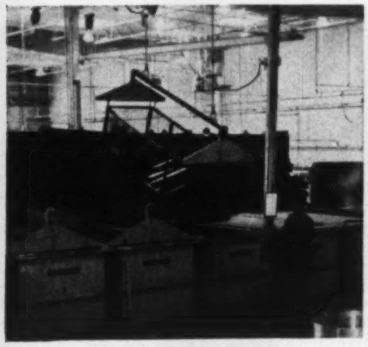
Peterbilt uses Alodine for pre-treating aluminum, finds it eliminates the need for prime coating parts, adds corrosion resistance and paint adhesion qualities, provides a clean welding surface so that no strength is lost. On steel, Granodine produces similar corrosion resistance and paint adhesion features; where steel is stored for several days, Granodine prevents oxidization, keeps the metal rust-free until use.

On the metal treating line Alodine and Granodine speed production, have cut time and labor by over 65 percent over previously used methods. Maintenance is nil, dip tanks have not been emptied or cleaned since mid-1960, yet chemical coating uniformity remains at peak high! Peterbilt personnel state for the record—"*As far as we are concerned the process is 100 percent perfect.*"

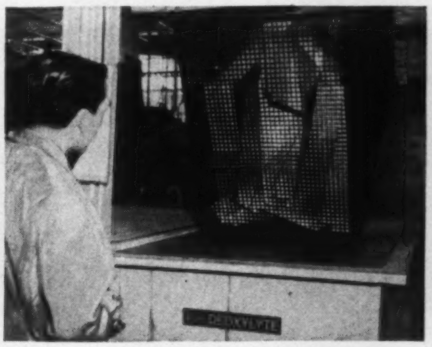
If you fabricate transportation equipment, consider the most efficient metal protection available for your product—an Amchem process and conversion coating chemical for virtually all production type metals. Consult your local Amchem Representative.

*Amchem's registered trademark for its conversion coating chemical for aluminum.

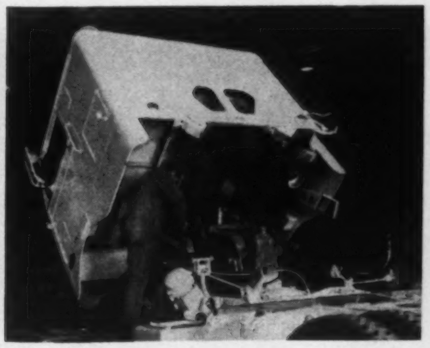
**Amchem's registered trademark for its conversion coating chemical used to produce phosphate coatings on steel.



Overall view of Amchem dip line. Both aluminum and steel can be treated interchangeably through in-line operation.



Baskets of parts coming out of final acidulated rinse are easily controlled by one man operating overhead trolley conveyor system.



Final in-plant inspection on tilt-cab truck. Vehicle receives final adjustment and rigorous road testing before shipment.

AMCHEM PRODUCTS, INC.

Amchem is a registered trademark of
AMCHEM PRODUCTS, INC. (Formerly American Chemical Paint Co.)
AMBLER, PA. • St. Joseph, Mo. • Niles, Calif. • Detroit, Mich. • Windsor, Ont.

***Now* you can get USS "T-1" Steel from Steel Service Centers coast to coast.**

STEEL
SERVICE CENTER
INSTITUTE

"T-1" Steel throat swallows 150,000 tons of coal a year

This mining machine in action looks like a greedy dragon at the mine face, stuffing its mouth with coal at the rate of about 150,000 tons a year.

The material selected for the conveyor "throat" was USS "T-1" Steel. The designers and builders, Lee-Norse Company, wanted a steel that would stand up under the grinding action of the coal for at least 200,000 tons. So far, USS "T-1" Steel has more than met their expectations . . . not only in the conveyor deck plates but also in the crawler wear plates.

Recently, one of these machines was rebuilt, yet it will continue to use its *original* "T-1" Steel conveyor deck plates. These plates handled about 260,000 tons of coal on the first time around and there's a possibility they might be able to handle another 250,000 tons before replacement is needed.

The reasons for the long life of USS "T-1" Steel are its high resistance to impact abrasion, plus great strength and toughness. In other applications, such as shovel teeth and lips, chutes and vibrating screens, USS "T-1" Steel has outlasted other metals up to five times! This means substantial reductions in maintenance costs and the big machines stay on the job longer.

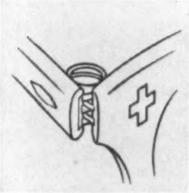
USS "T-1" Steel and the new, lower-priced "T-1" type A Steel can be furnished to a minimum yield strength of 100,000 psi, or a minimum hardness of 321 Brinell, depending on application. USS "T-1" Steel can also be furnished to 360 Brinell. All of these tough, weldable steels can reduce weight and increase the strength and life of your equipment. Call your local Steel Service Center for more information. Or, for the name of the distributor of USS 'T-1" Steels nearest you, write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa. USS and "T-1" are registered trademarks.

United States Steel Corporation • Columbia-Geneva Steel Division • National Tube Division • Tennessee Coal and Iron Division • United States Steel Export Company

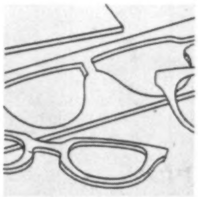
United States Steel

IT'S AS IF YOU DESIGNED THE Y-30 LINE

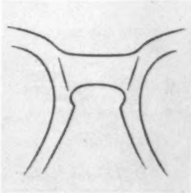
NEW *B&L Safety Glasses combine all the features you want most*



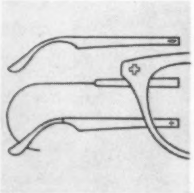
Mitre joint temples for easy fitting. No stronger hinge on the market.



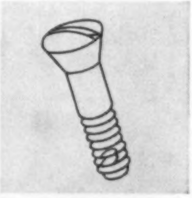
Front is cut from sturdy sheet acetate, stronger than molding.



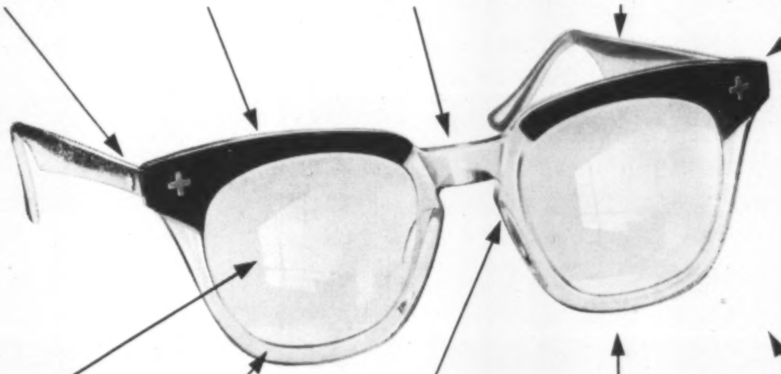
Keyhole bridge for comfortable, pressure-free nasal fit. All sizes.

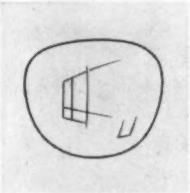


Crystal, flesh and aluminum temples, easily interchanged.

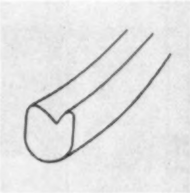


Re-usable Nylok temple screws insure temples always fitting snugly.

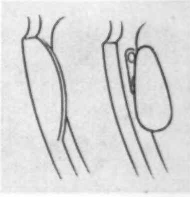




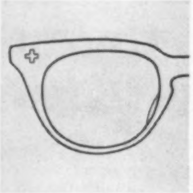
Bal-SAFE lens toughest on the market. Clear or 3 Ray-Ban shades, or clear Enduron hard resin.



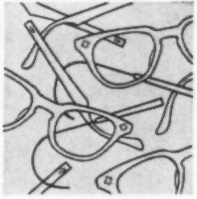
Deeper, off-center buttressed eyewire groove, more than doubles lens retention.



Comfort assured by broad rigid or adjustable nose pads, easy to fit.



S-7 lens shape for smart good looks, unobstructed vision, extra safety.



Complete interchangeability: fronts, temples, lenses, screws.

Here's smart appearance, new strength, built-in comfort, sure economy. Good looks to win workers' esteem. Much stronger frames, including a deeper buttressed eyewire groove which more than doubles lens retention. Wearer comfort assured by Bausch & Lomb expertness in ophthalmic eyewear design. Complete interchangeability and other new features assure real savings in safety eyewear costs. Mail coupon today for full Y-30 information.

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98523 Lomb Park, Rochester 2, N. Y.

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Please send full information on your Y-30 line of Safety Frames.

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Protection-PLUS Safety Products

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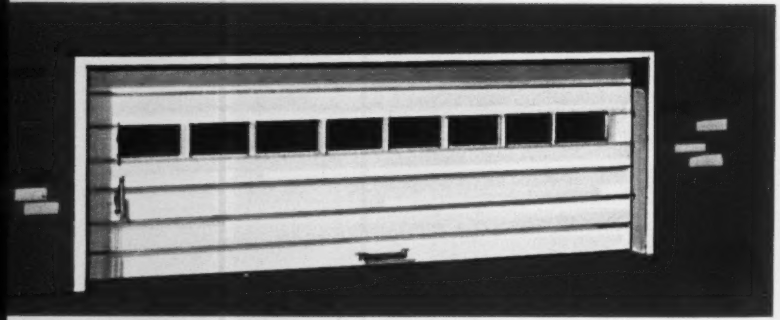
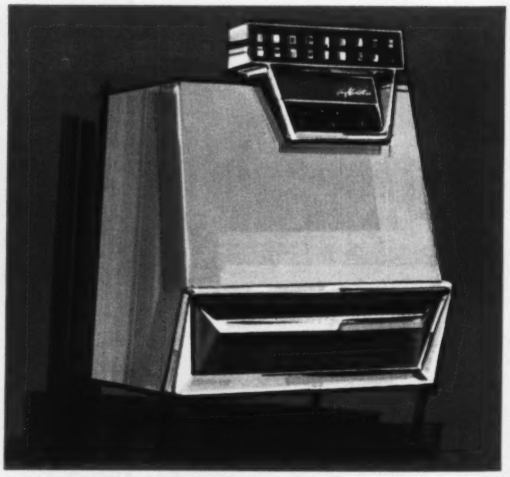
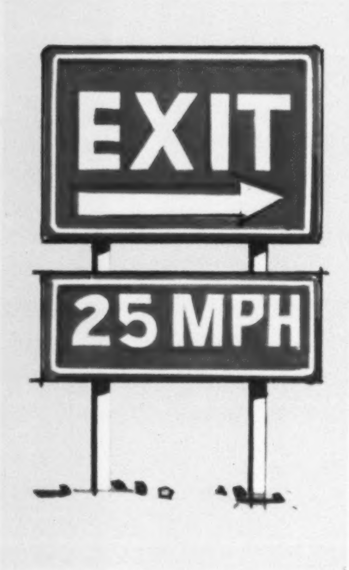
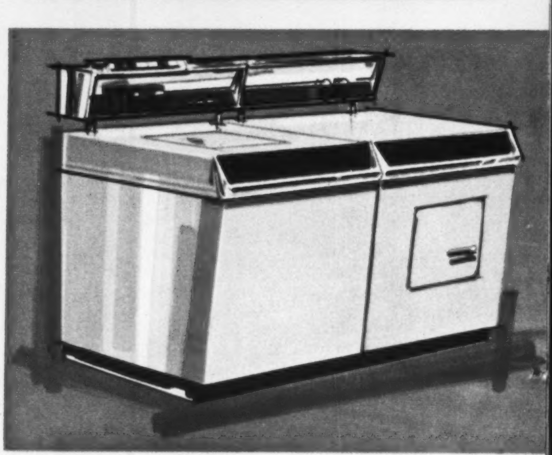
protection + economy + worker acceptance

TWO NEW SPANGLE-FREE ARMCO ZINC-COATED CAN GIVE YOUR PRODUCTS STYLE AND









New steels are
born at
Armco

STEELS STAMINA

Armco ZINCGRIP A — and ZINCGRIP A, PAINTGRIP offer excellent surfaces for painting, unbroken protection from rust, faster spot welding.

Spangle-free surfaces on new Armco ZINCGRIP® A and ZINCGRIP A, PAINTGRIP® permit finishes rivaling those on cold-rolled steel. ZINCGRIP A requires pre-treatment for painting, but ZINCGRIP A, PAINTGRIP comes with a mill-applied paint-holding surface that takes paint immediately and holds it longer.

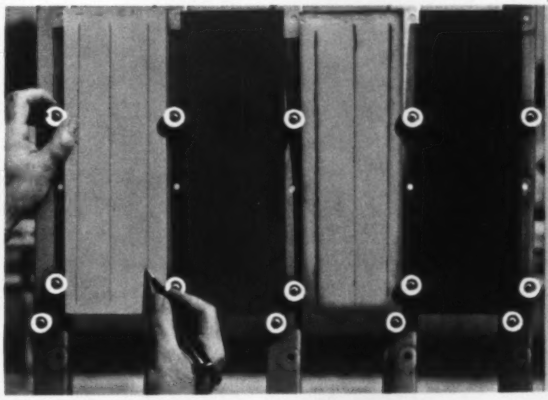
Severe fabrication won't cause their coatings to flake or peel. They're as workable as Armco ZINCGRIP Steel, the **original** continuous hot-dip zinc-coated steel.

Spot welding goes easier, too. Twice as many spot welds can be made before electrode tips need redressing as with regular galvanized steels.

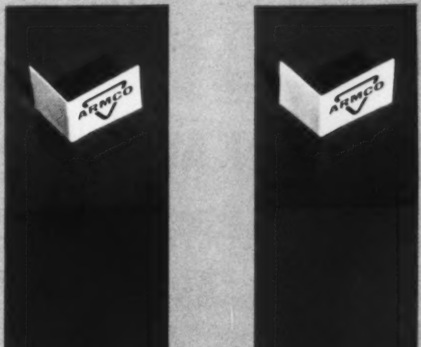
Coils and cut lengths of these spangle-free grades are available in gages from 16 through 24, depending on width, in widths up to 48 inches, depending on gage. Mail the coupon for details.

Galvanized Steel

Put this symbol of strength, durability and economy on the products you sell.



The first two samples are painted and unpainted Armco ZINCGRIP A, PAINTGRIP; the third and fourth are cold-rolled steel treated for painting. All were exposed 3 years in Armco's corrosion testing yard. Note absence of rust on the ZINCGRIP A, PAINTGRIP. Even paint on the cold-rolled steel did not ward off corrosion.



Sample at left is cold-rolled steel, surface-treated for painting; sample at right is ZINCGRIP A, PAINTGRIP. Top half of each is painted. There's little to choose in appearance, yet ZINCGRIP A, PAINTGRIP offers lasting protection.

Armco Division, Armco Steel Corporation
2101 Curtis Street, Middletown, Ohio

Please send me your product data bulletin on Armco ZINCGRIP A and ZINCGRIP A, PAINTGRIP.

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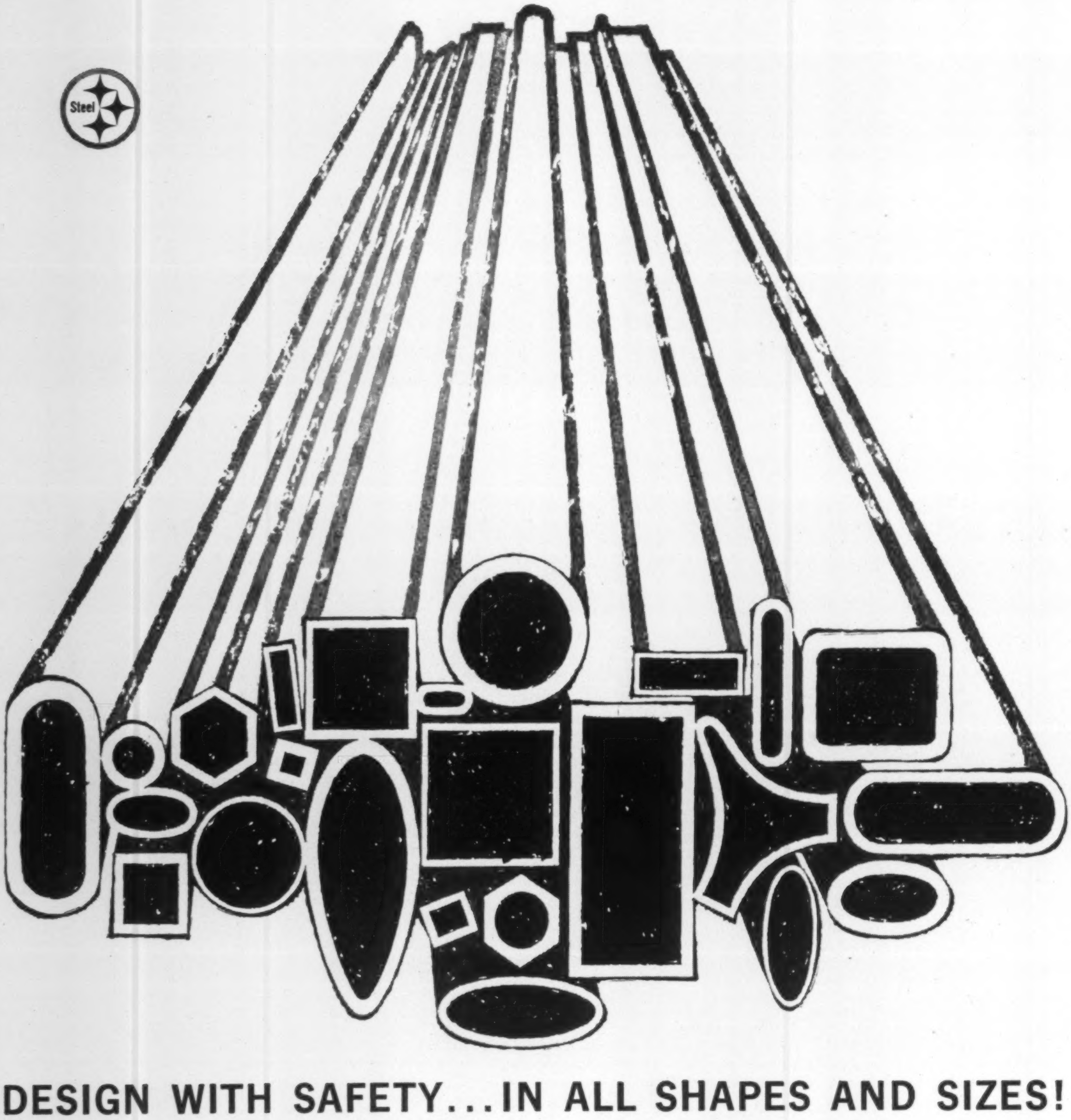
Firm____________________________

Street___________________________

City_______________Zone_____State_______

ARMCO Armco Division



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The Standard Tube Co. / │
Superior Tube Co. │
Trent Tube Co., Subs. Crucible Steel Co. of America │
Union Steel Corp. │
Van Huffel Tube Corp. /
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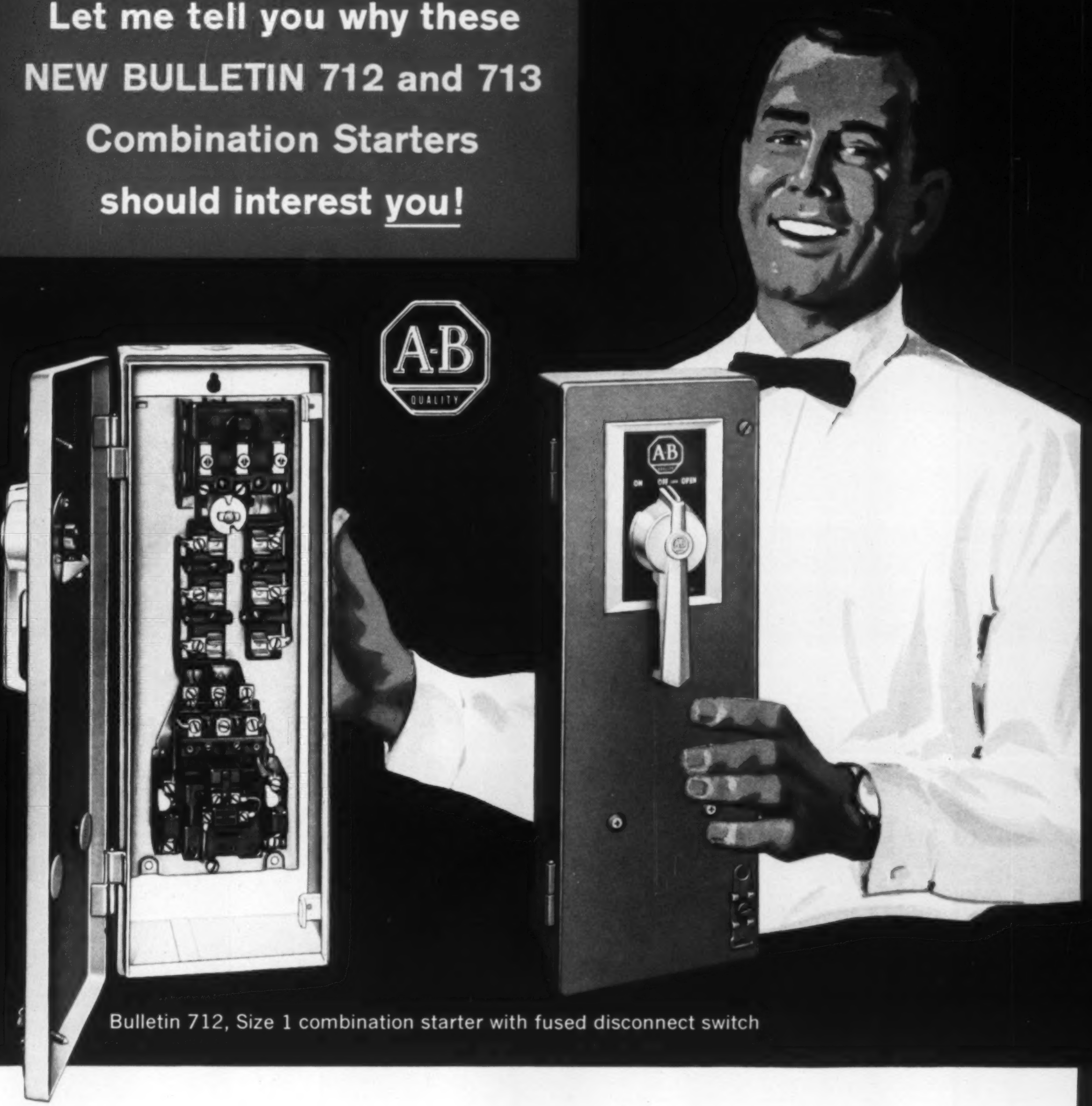
/ PRODUCES WELDED CARBON STEEL TUBE

Regardless of the shape or size, when you specify domestically-produced welded steel tubing, you are assuring uniformity. Wall thicknesses are uniform, concentricity exact. In a rotating part, the result is a better, safer, vibration-free operation. In other applications, the welded steel tube gives you the same design strength as bar stock, with less weight.

The quality producers at left are prepared to help you design with tubing in all weldable grades of carbon, stainless steel and other alloys. You can get useful information from any of them or you can write for your free Booklet 8591, Dept. IA-7, Welded Steel Tube Institute, Inc., Hanna Building, Cleveland 15, Ohio. It will pay in uniformity, safety, and savings in weight.

WELDED STEEL TUBE INSTITUTE, INC.

Let me tell you why these NEW BULLETIN 712 and 713 Combination Starters should interest you!



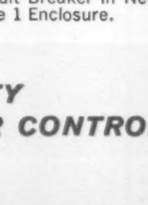
Bulletin 712, Size 1 combination starter with fused disconnect switch

They have — Smaller Size...Greater Switching Capacity... Greater Reliability...Longer Life...Complete Safety... Generous Wiring Room...Simple Design...Businesslike Beauty

Rating for rating, the new Bulletin 712 motor starter will outperform and outlast all others. Complete safety for the operator is assured because the cabinet door cannot be opened until the lever is moved to the OPEN position, which opens the visible contact disconnect switch.

The Bulletin 713 combination starter provides similar features for complete safety, but uses an ITE circuit breaker as a method of disconnecting.

Brooks Stevens, famous industrial designer, has given the entire line of enclosures, an undeniable "eye appeal"—an asset to any modern machine tool or industrial installation. Please write for details, in Publication 6100: Allen-Bradley Co., 1316 S. Second Street, Milwaukee 4, Wis.



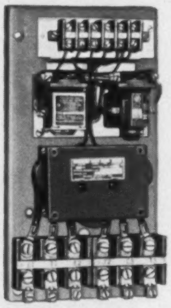
BULLETIN 713
Combination Starter with Circuit Breaker in Nema Type 1 Enclosure.

16-61-MR

ALLEN-BRADLEY
Member of NEMA

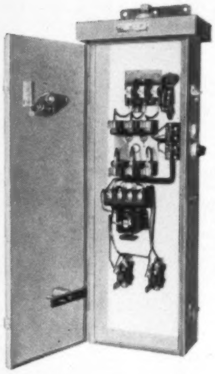
QUALITY MOTOR CONTROL

Your A-B Handy Catalog Lists These Control Devices Often Considered "Special"



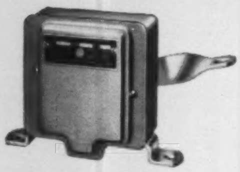
BULLETIN 812
Phase Failure—Phase Reversal Relays

Style F relay (above) protects against all open phase conditions on a branch motor circuit. Style R disconnects the motor upon a phase reversal. Style RF gives phase failure and phase reversal protection.



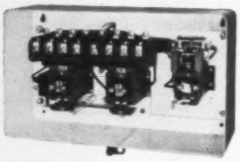
BULLETIN 1232
Pump Control Panels

Complete units for automatic operation of irrigation and oil well pumps. Employ standard A-B Bulletin 709 magnetic starter with manual disconnect switch or circuit breaker in weatherproof enclosure. Wide variety of optional features available.



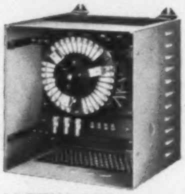
BULLETIN 840
Float Switches

These quality switches are available in a wide range of types for automatic control of motors operating tank or sump pumps. The snap-action switch mechanism assures positive operation, no matter how slowly the liquid level changes.



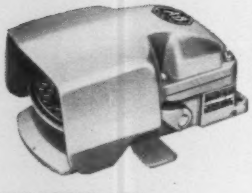
BULLETIN 1270
Automatic Transfer Switches

These switches are designed to transfer power-load to standby supply when normal power fails or drops too low. Automatically returns load to normal supply when power is resumed. Mechanically interlocked.



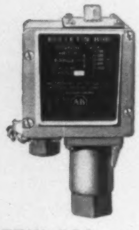
BULLETIN 555
Speed Regulators

Provide manual speed control of wound rotor motors for either fan or machine duty. When used with magnetic starter, the first step closes control circuit.



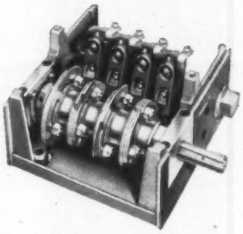
BULLETIN 805
Foot Switches

Ruggedly built to withstand the most severe industrial usage. Snap-action switch mechanism features maintenance free silver contacts. The foot switch shown above assures complete "safety" for the operator. Also made without top guard.



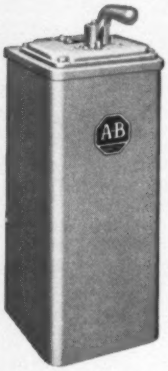
BULLETIN 836
Pressure Controls

For machine tool hydraulic systems operating at pressures up to 5000 psi. Oiltight enclosure. Operating pressure and differential are adjustable. A visible indicator shows trip point. Maintenance free silver contacts.



BULLETIN 803
Rotating Cam Limit Switches

Heavy-duty controls for use on automatic production machines. Made with up to 12 independent circuits which can be separately adjusted for operation at any point of rotation.



BULLETIN 365
Multi-Speed Drum Switches

Designed for manual starting, speed changing, and reversing of polyphase multi-speed motors. Made for up to four speeds either nonreversing or reversing.

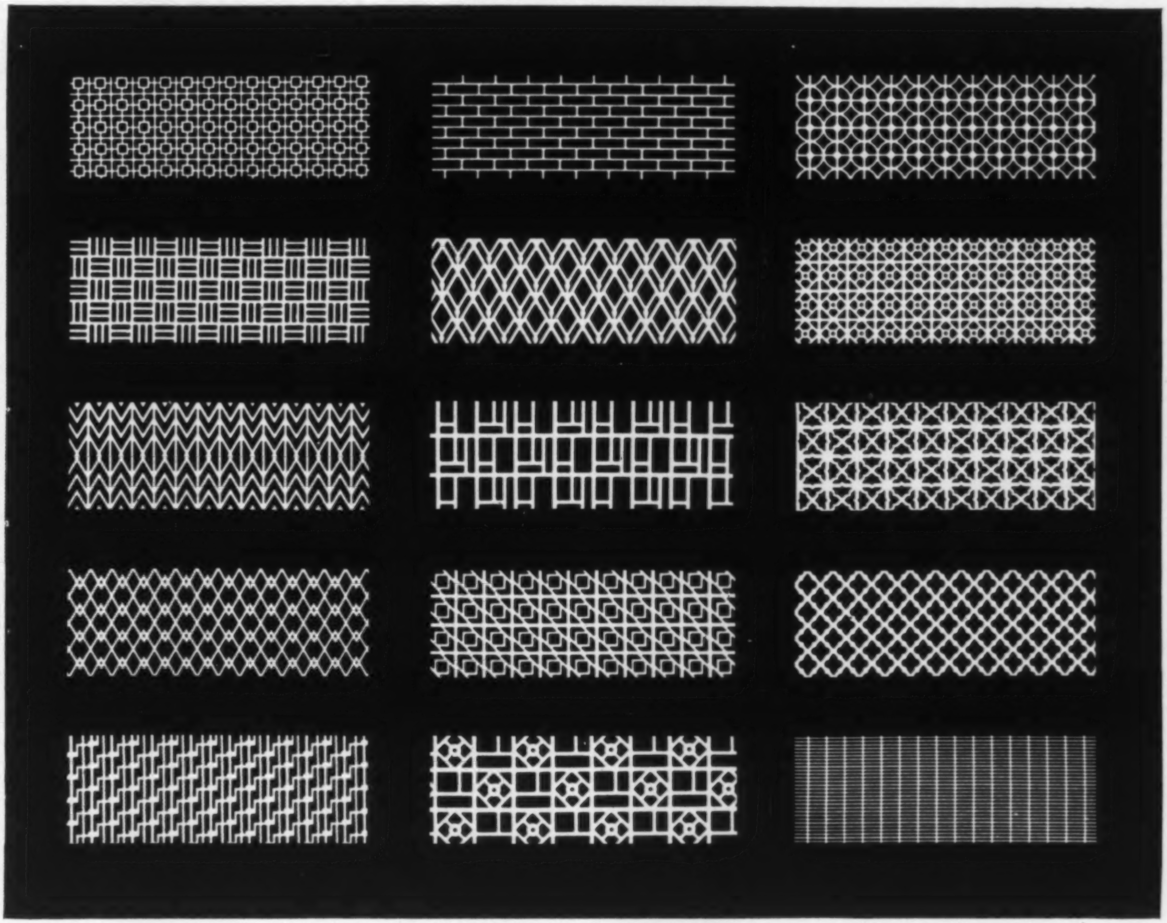
ALLEN-BRADLEY

Member of NEMA

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

QUALITY MOTOR CONTROL

16-61-MR



Why Metalworkers Work With Hendrick Perforated Metal

For well over 80 years the metalworking industry has relied on Hendrick for its perforated metal requirements. And with good reason! Hendrick perforated metal combines decorative beauty with the functional strength so often called for on new product specifications. Hendrick's vast stock of dies includes over 100 unusual patterns that are exclusive and only obtainable from the Hendrick Manufacturing Company.

Hendrick perforated plate is available in every type of commercially rolled metal in gauges and sizes of perforations to meet your exact specifications. For more information call your nearby Hendrick sales office. It's listed in your classified telephone directory under Metals, Perforated. Or —for FREE booklet, mail the coupon, today.

HENDRICK Manufacturing Company
37 Dundaff Street, Carbondale, Pennsylvania

Gentlemen: ☐ Please send me FREE booklet.
☐ Have representative call.
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Perforated Metal • Perforated Metal Screens • Wedge Slot Screens • Hendrick Wedge Wire Screens • Architectural Grilles
Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids • Hydro Dehazers • Distillation Column Internals

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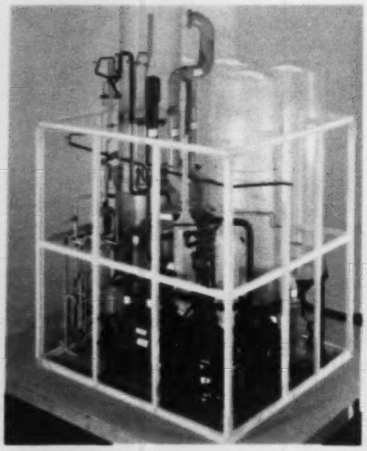
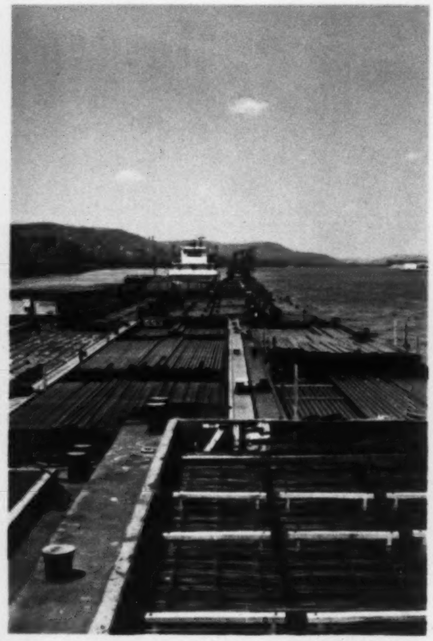
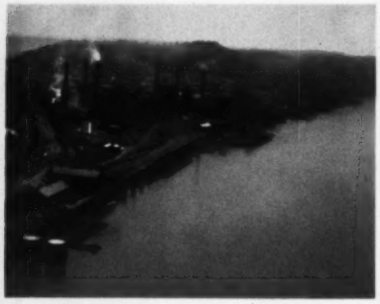


SEPARATES: Engineering model of cold box for a Dravo-Linde AG air separation plant. Highly efficient, these units produce oxygen at low cost. Dravo turn-key construction services also include power and steam plants, water pumping and treatment systems, piping, other plant installations. Check coupon for details.

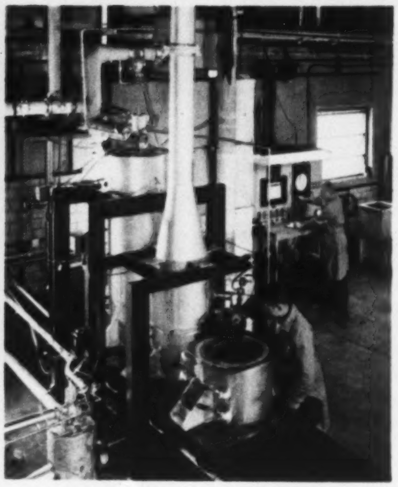


TRANSPORTS: Union Barge Line, Dravo subsidiary, offers common carrier and contract transportation service to all points on the Mississippi River System and Gulf Intracoastal Waterway. Modern equipment, regularly scheduled sailings assure economical and reliable deliveries. For details, check and mail the coupon.



HANDLES: This giant multi-purpose dock handles incoming raw materials and outgoing products for major steel producer. Dravo pioneered cellular dock construction and has built them of all sizes for virtually every industry. For information on docks and Dravo bulk materials handling equipment, mail the coupon below.

HEATS: Eleven Dravo space heaters provide low-cost comfort heating in this fabricating plant. Over 20,000 units (250,000 to 2,500,000 btu) have been installed in many different types of buildings of all sizes. Check, mail coupon for information.



◀ **AGGLOMERATES:** At Dravo Research Center, continuing studies are conducted to improve pelletizing, briquetting and sintering processes and plant design. For details on agglomeration or beneficiation processes, check and mail the coupon.

REDUCES: Stora-Kaldo basic oxygen steelmaking process offers high metallurgical control, heat economy and yield. Dravo designs and builds these plants in the U.S.A. and Canada. ▶

Dravo Corporation, 4800 Grand Avenue, Pittsburgh 25, Pa.

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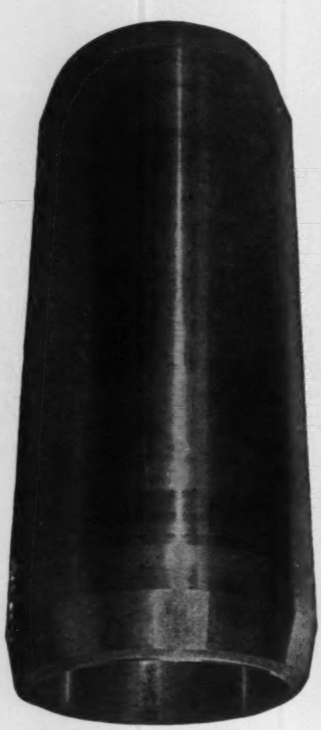
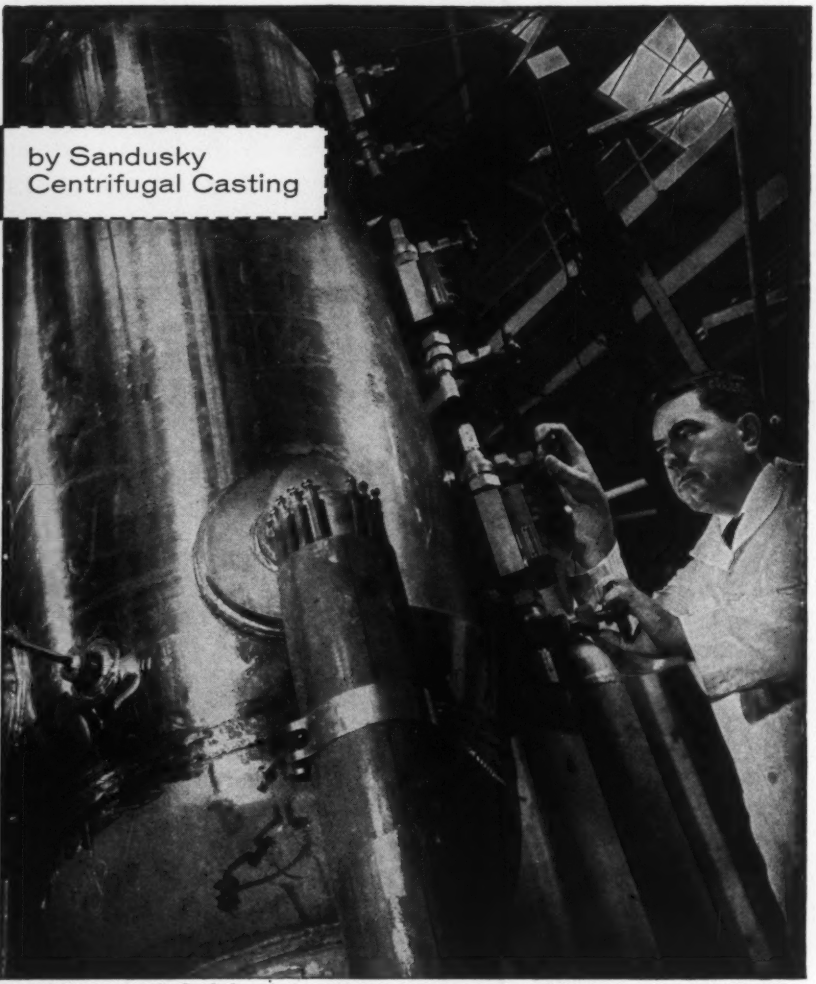
Handles, Heats, Agglomerates

SOLVED: by Sandusky Centrifugal Casting





This photo, showing the Sandusky cylinder welded into position, courtesy of the Lummus Company, New York. New York who fabricated, assembled and tested the completed loop before shipping it to the ETR site in Idaho.

Nuclear Test Loop Uses Sandusky Centrifugal Casting as Pressurizer Cylinder

A Sandusky Centrifugal Casting is the main cylindrical component of an electrically heated pressurizer, designed by Knolls Atomic Power Laboratory to Section VIII, of the ASME Code (Unfired Pressure Vessels) for use in the new Engineering Test Reactor facilities at Idaho Falls, Idaho.

This 66¼" long cylinder, 27" O.D. with walls 2½" thick, was centrifugally cast of an 18-8 stainless steel (SA-351, Grade CF-8) for the extra corrosion resistance required under nuclear loop service conditions: demineralized water at temperatures to 650°F and pressures to 2500 PSI.

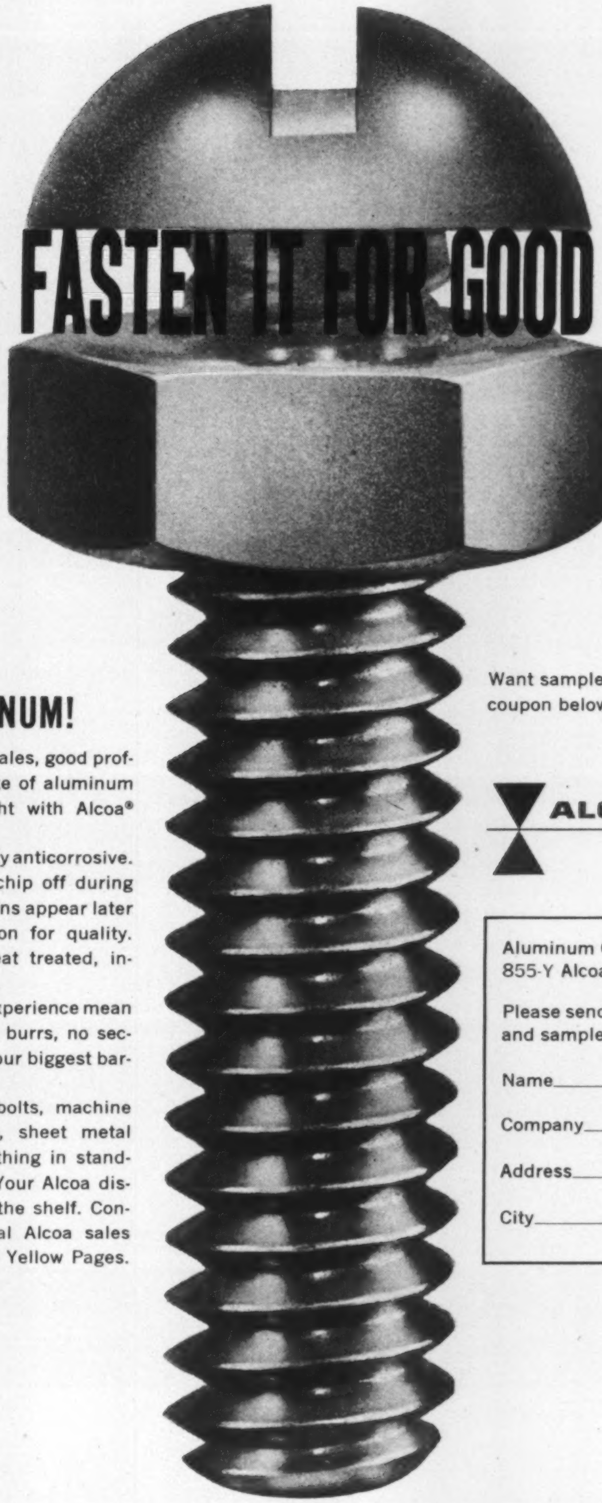
O. G. Kelley Co., Boston, to whom we delivered this 2-ton, fully machined cylinder, welded on the forged heads and nozzles, radiographed the welds, and hydro tested the completed vessel to 4300 PSI.

This is another example of the adaptability of Sandusky Centrifugal Castings to applications demanding the highest order of quality. They may well offer you a practical and economical answer to your cylindrical needs, also.

We are producing cylinders and piping in diameters from 7" to 54"—in lengths to 33 ft.—in a wide range of ferrous and non-ferrous alloys. Write for Bulletin 300, for more complete technical information on the Sandusky process and product application data.

SANDUSKY *CENTRIFUGAL CASTINGS*
FOUNDRY & MACHINE CO.

SANDUSKY, OHIO—Stainless, Carbon, Low-Alloy Steels—Full Range Copper-Base, Nickel-Base Alloys



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For good looks, good sales, good profits—*whatever* you make of aluminum—put it together right with Alcoa® Aluminum Fasteners.

Aluminum's naturally anticorrosive. It has no coating to chip off during assembly. No ugly stains appear later to mar your reputation for quality. Proper alloy, fully heat treated, insures lasting strength.

Alcoa's 40 years of experience mean a lot: full threads, no burrs, no seconds and *full count*—your biggest bargain, dollar for dollar.

Need rivets, nuts, bolts, machine screws, wood screws, sheet metal screws, washers—anything in standard types and sizes? Your Alcoa distributor has them on the shelf. Consult him or your local Alcoa sales office. Both are in the Yellow Pages.

Want samples, specification data? Send in the coupon below, today!

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855-Y Alcoa Bldg., Pittsburgh 19, Pa.

Please send me complete specification data and samples of Alcoa Aluminum Fasteners.

Name____________________Title__________

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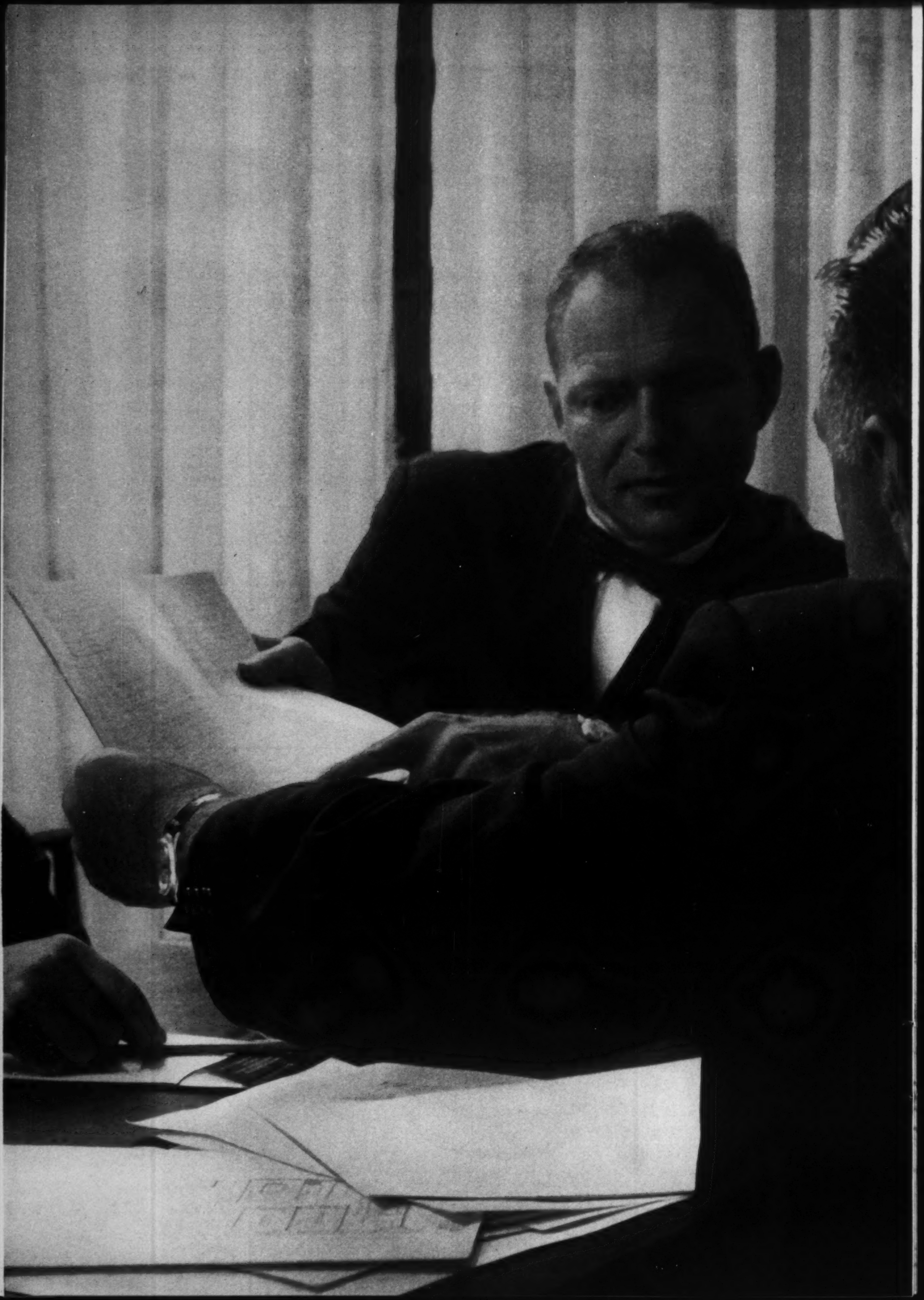


"Bob, the computer analysis says we should buy those parts instead of making them"

NEW CAPITAL INVESTMENT PROGRAM

Here's a new IBM computer program that's yours for the asking. Using the Investors Method (Rate of Return on Investment), it helps you evaluate—*quickly, economically, uniformly*—alternate proposals for spending your company's money.

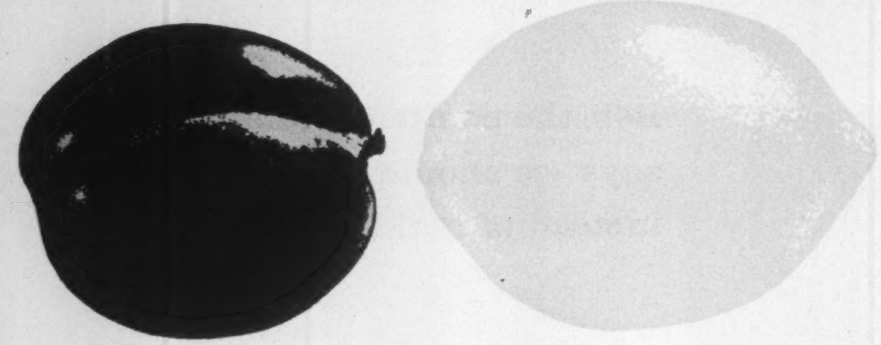
The program will help you solve problems like these: should you buy a new piece of equipment or keep the old one in repair; should you increase your manufacturing facilities; should you buy or make certain products; how should you spend your money for research to make the most profit?

These are only a few of the problems that the Capital Investment Program handles. All it takes is the Program and an IBM computer that accepts FORTRAN programming language. The low cost IBM 1620 Data Processing System is one such computer.

The new Capital Investment Program is another of the many problem solving programs IBM offers you to help make your data processing system a more effective and more profitable tool for managing your business.

Your local IBM Representative can give you complete details on this, as well as previously announced programs, which included Sales Forecasting, Materials Planning, Inventory Management, Plant Scheduling, Work Dispatching, Operations Evaluation, Inventory Management Simulation, and many others.

IBM®
DATA PROCESSING



Will your product stand the test of the market place?

The decision to change a material in a product can often determine its success or failure in today's business of selling. It is in this heavily mined zone of decision that men and boys separate. The odds are generally fair. The right decision is a plum; the wrong one is a lemon.

The decision to specify a change in a basic material for a product can have equally good and bad results. The market will soon determine the wisdom of the decision to change. To get to the point: the decision to specify stainless steel for a product can become a marketing edge or a costly dud. In most cases, it is no easy decision. Stainless steel may cost more in the beginning. This added cost is reflected in the finished product generally. But note well: not always.

The primary point is that stainless steel, although handicapped with a higher price, will generally win the performance race against most other materials. Now, higher price squares against better performance. This is the what-price-quality dilemma. It is in this area where plums and lemons come into being. Better performance can bring in greater market acceptance; higher price can leave your product rejected. This market reaction, in turn, is based on price buyers and performance buyers. However, there's a bedrock adage: you get what you pay for.

Give stainless steel a fair shake. To help you measure it against other materials, here are some points that may persuade you to consider it.

	Look at Your Product	**Yes**	**No**	**Maybe**
1	Is painting necessary for appearance?			
2	Will paint or other surface coating stand up in service?			
3	Does your product suggest quality?			
4	Would a bright, lustrous finish add sales appeal?			
5	Does your product require repeated cleaning?			
6	Does the surface have to be clean, smooth, attractive?			
7	Is your product exposed to weather, dirt, food, chemicals, pests, water, abrasion, impact, heat or extreme cold?			
8	Will replacement costs and annoyance to the user impair repeat business?			
9	Are there times and places where your product in use calls for great strength and utmost reliability?			
10	Can you save in packing and shipping costs with a lighter product?			
11	Can you estimate on a percentage basis the savings in fewer service complaints and reduced damage?			

There is a chance that, with some close arithmetic, you can come up with a break-even price on the product with stainless steel—not always—but often. Do not dismiss better performance. There may be an honest competitive edge . . . and possibly a moment of glory. But no matter, when you go to stainless steel, you go first class. When you do use stainless, be sure to specify USS Stainless Steel. United States Steel offers metallurgical assistance and market building aid to develop and enlarge your uses of stainless steel. For more information on the many grades of stainless available for fast shipment, call your Steel Service Center.

USS TRADEMARK **United States Steel**

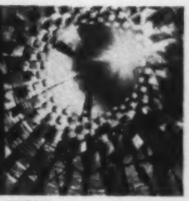
No material comes close to Stainless Steel's Versatility

By way of illustration here are a few "opposites" that prove our point

HOT. Temperatures in a jet afterburner reach 1400°F—but stainless steel doesn't lose its strength.

COLD. Stainless heat exchanger operates at temperatures as low as —443°F.

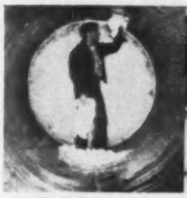
WET. Combination of moisture and coal would corrode nearly anything but stainless.



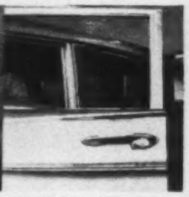
DRY. Rotary dryer is used to dry pharmaceutical ingredients.

CLEAN. Milk dispensers of stainless steel prevent contamination.

DIRTY. Stainless steel piston rings have excellent resistance to high temperature corrosion.

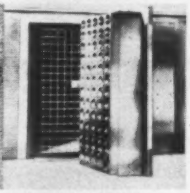


INSIDE. Chemical tanker needs only a simple wash-out for cleaning because it's stainless.



OUTSIDE. Stainless automobile trim always stays bright and good-looking.

LIGHT. Stainless steel jewelry has a light, graceful appearance.



HEAVY. Strength and hardness of stainless combine to make safe doors safe.

ROLL. Stainless ball bearings take a lot of punishment, still operate at peak efficiency.

SLIDE. Abrasion resistance of stainless steel makes chutes last longer.

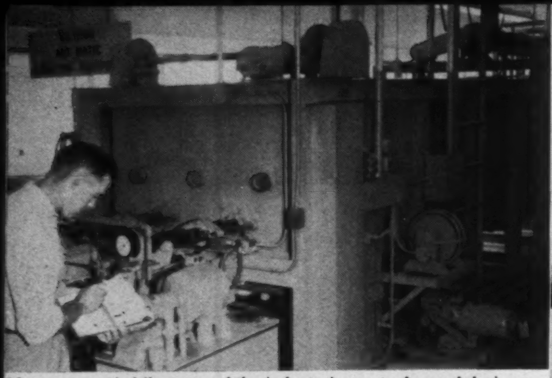
FORM. Stainless steel wristwatch defies corrosion, keeps time *and* beauty.

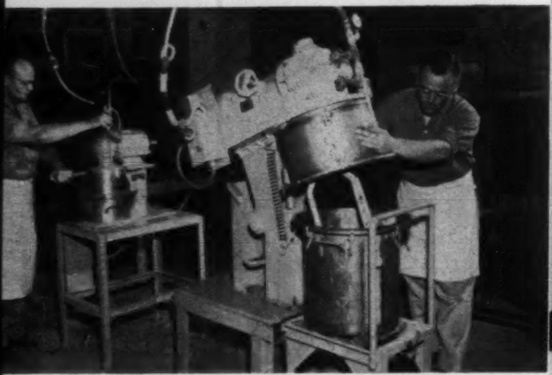
FUNCTION. Stainless steel muffler keeps silent despite high temperatures.

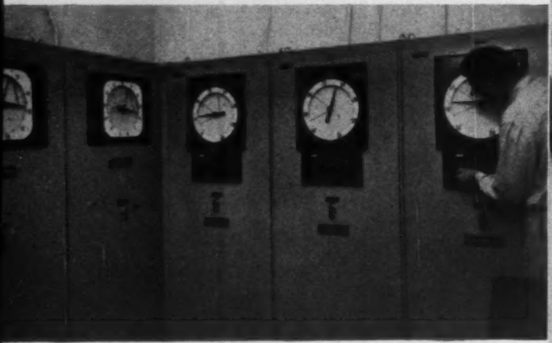
WATER. Stainless sinks stay bright, beautiful, easy to clean.

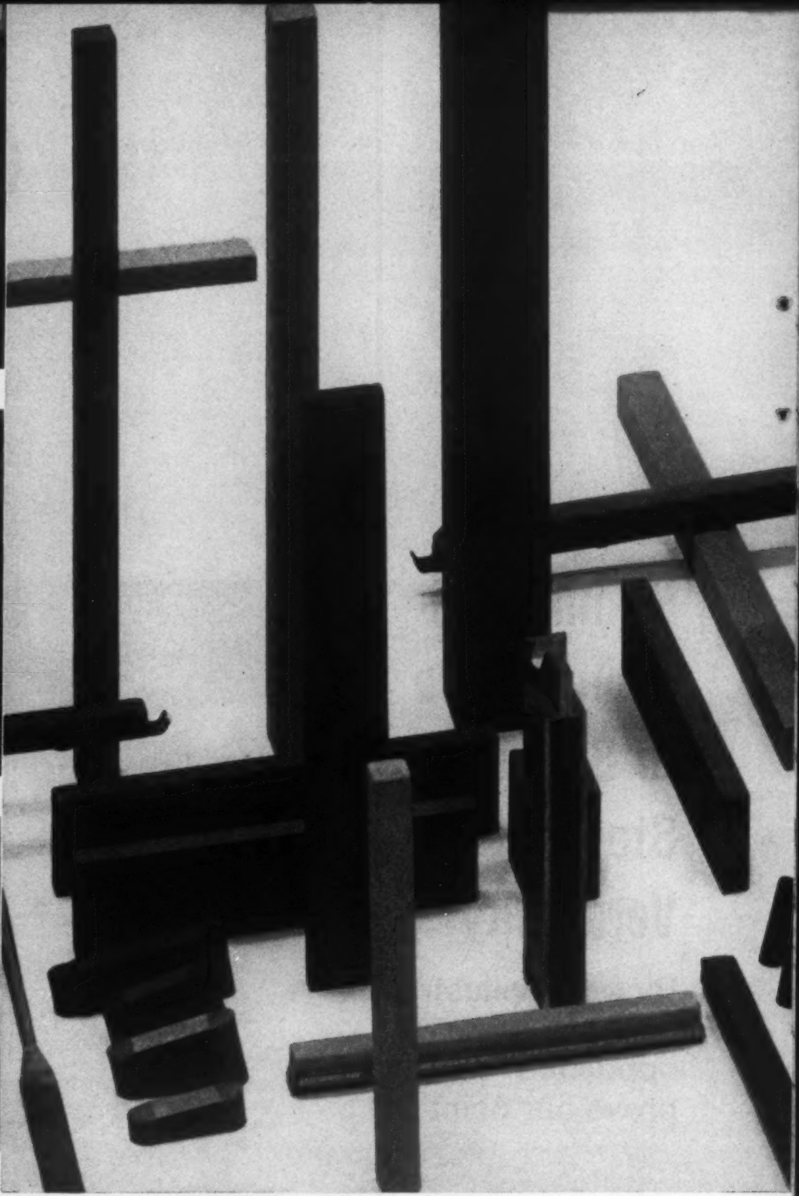
FIRE. Stainless steel shingles inside cat crackers are red hot, still don't lose their great strength.

Order Stainless Steel from
your nearest Steel Service Center


New automatic kiln—one of the industry's most advanced designs.


Precision vacuum-mixing to guarantee uniformity of the mix.


Electronic kiln controls, housed in special, air-conditioned room.



NEW TECHNIQUES unfailingly

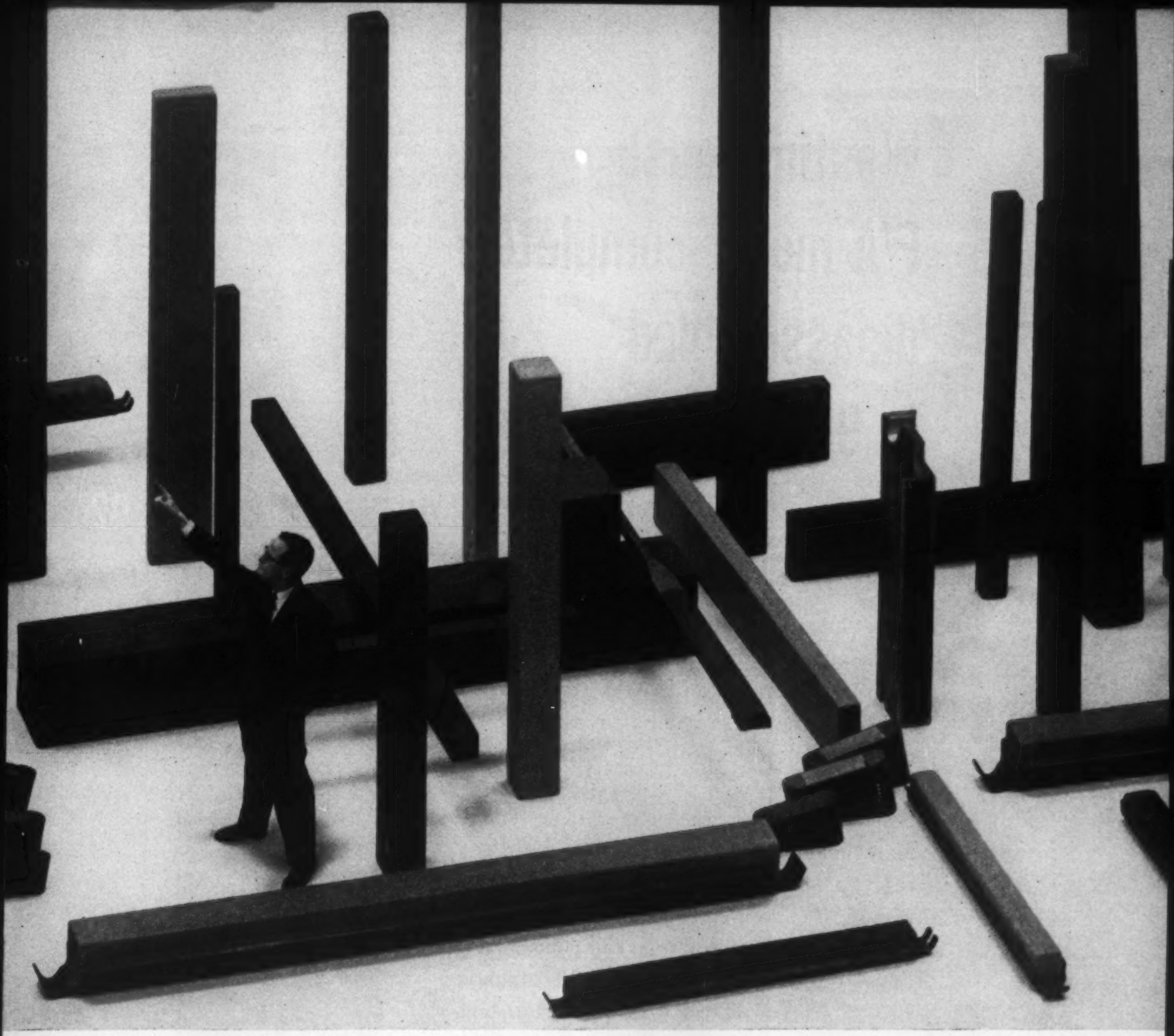
Bay State has perfected a completely new process for the manufacture of honing stones which *improves performance . . .* and ensures *more perfect duplication* than has ever been possible before. Result: Honing stones that set entirely new standards for uniformity of texture, hardness and even color . . . stone after stone after stone.

The process starts with the formulation of new bond-abrasive mixtures that ensure uniform dispersion of *all* elements throughout the entire mix. Next comes vacuum mixing: high vacuum in the mixing chamber forces even microscopic bubbles out of the mix and rigid temperature control further guarantees uniformity of the mix.

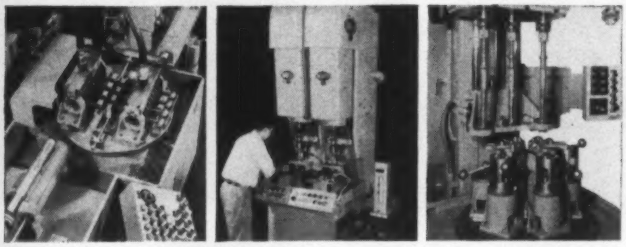
Final step is firing in the most efficient, automatic kiln yet developed. Even the chemical composition of the atmosphere inside the kiln is controlled by an exothermic gas generator which maintains exactly the combination of gases that best suits the stones being fired.

BAY STATE
WHEELS of PROGRESS

BAY STATE



duplicate the finest honing stones ever



Production runs of Bay State's new-process honing stones have been exhaustively tested on Bay State's own, in-plant honing equipment ... *and* on every leading type of machine, such as the MICROMATIC, JES-CAL and BARNESDRIL machines illustrated above. *Ask your honing stone supplier for Bay State's new-process stones.*

BAY STATE ABRASIVE PRODUCTS CO.
Westboro, Mass.

Please send me your new 28-page Honing Stone catalog, that specifies which stones work best on what metals and alloys . . . explains how to speed stock removal, improve finish, lengthen tool life, reduce reject rate.

*Company*____________________

*Name*____________________

*Address*____________________

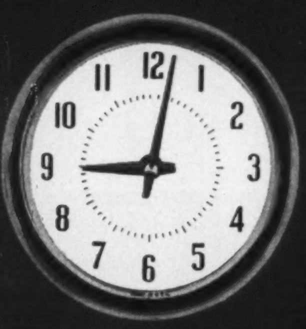
*City*__________ *State*__________

ABRASIVES

Bay State Abrasive Products Co., Westboro, Massachusetts.
In Canada: Bay State Abrasive Products Co., (Canada) Ltd., Brantford, Ontario.
Branch Offices: Chicago, Cleveland, Detroit, Los Angeles, Pittsburgh. *Distributors:* All principal cities.

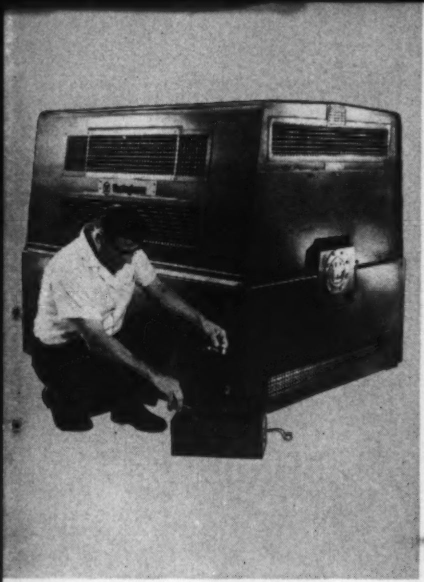
Westinghouse F/A motor completely disassembled in 90 minutes

Only 90 minutes are required to completely disassemble the Westinghouse F/A (fully accessible) motor. After cleaning, inspecting and servicing, the F/A motor can be completely reassembled and returned to service in about two hours. One maintenance engineer reports that an F/A motor is serviced in his shop in about one-fourth the normal time for comparably rated motors. F/A motors are available in ratings from 250 hp/600 rpm to 7000 hp/3600 rpm. For more information, call your Westinghouse representative. Or, write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania. *You can be sure . . . if it's Westinghouse.*



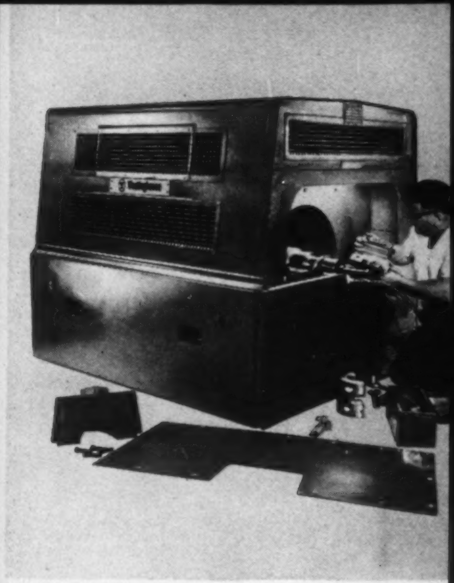
9:02

9:40

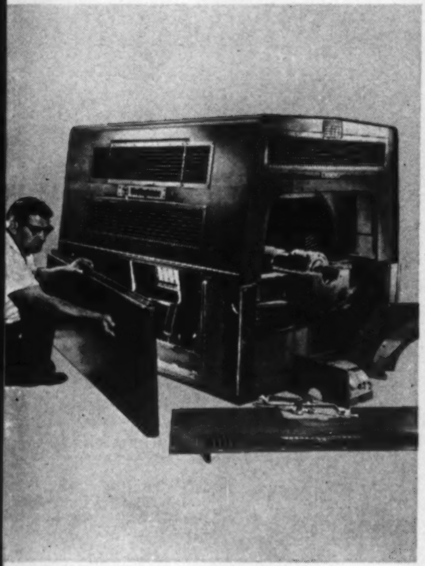


Motor stopped; disassembly begun.

9:20

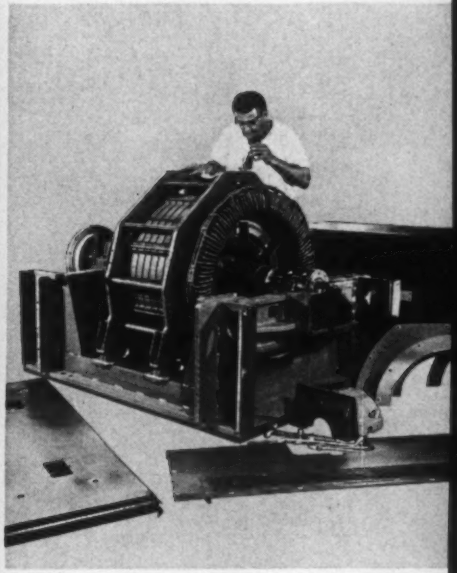


Sufficiently disassembled to permit bearing inspection.



End covers, side panels, air shields removed. Winding inspection now possible.

10:32

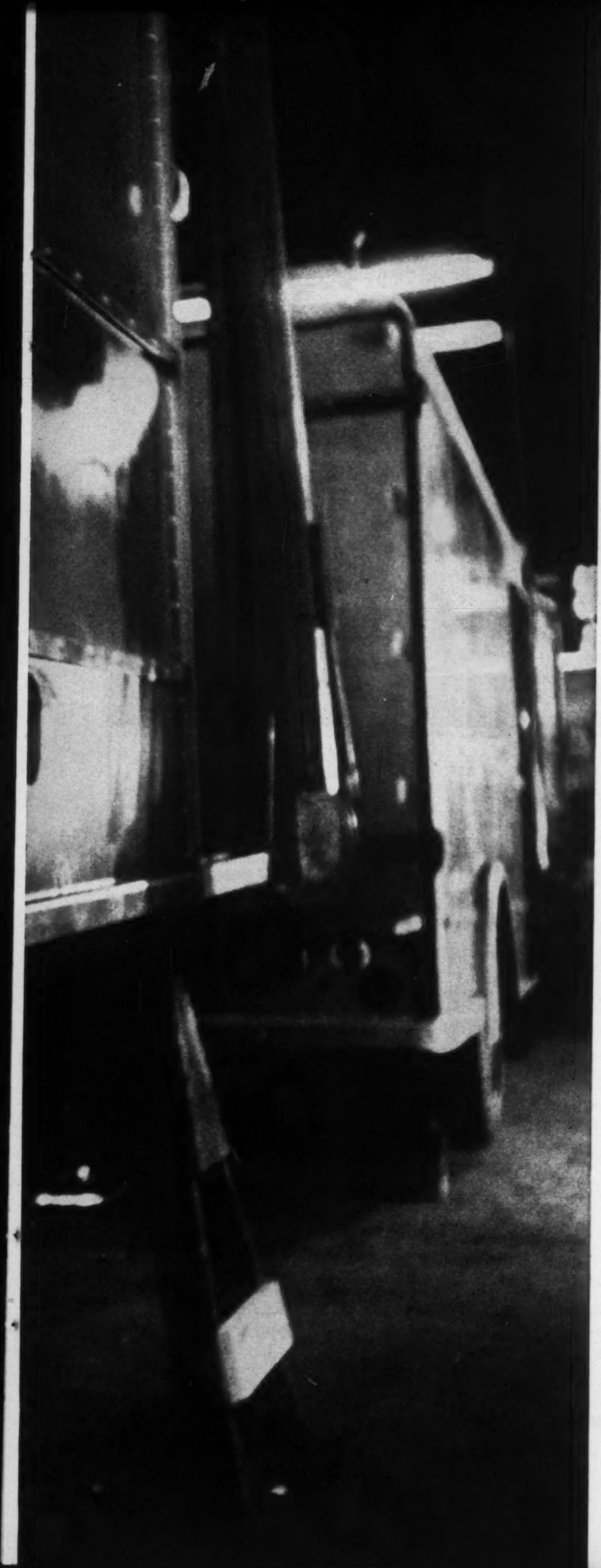


Complete disassembly possible for major cleaning, inspection and servicing.

J-15023

Westinghouse

. . . and reassembled in just two hours



HOW BOYERTOWN KEEPS EVERY BODY HAPPY

Boyertown Auto Body Works of Boyertown, Pennsylvania is keeping delivery truck owners, drivers and maintenance men especially happy these days by using a new, all-around material in its body construction: J&L Nickel-Copper-Titanium high-strength forming steel.

The owner is pleased because lighter weight means lower operating cost. And Boyertown has been able to save from 600 to 650 pounds over mild steel in a 12-foot forward control delivery body—with no sacrifice of strength!

The driver is satisfied because the increased ductility of J&L Nickel-Copper-Titanium makes it possible for Boyertown to design bodies with greater flexibility—provide more convenience and safety for the man behind the wheel.

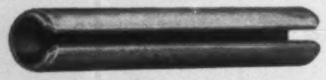
The maintenance man is happiest of all. J&L Nickel-Copper-Titanium has a minimum of 4 times the corrosion resistance of mild steel. (For extra protection, Boyertown coats it with rust-inhibiting zinc chromate). It has greater abrasive and impact resistance, and less tendency to dent and wear.

When maintenance is necessary, dents can be easily "bumped out," and repairs are quick and inexpensive.

That's why Boyertown—a pioneer in the use of high-strength steel—continues to specify J&L Nickel-Copper-Titanium for its exterior and interior truck panels, posts, ribs, cross members, floors, doors and windshield assembly. Ask your J&L salesman about J&L's other new high-strength steels, JLX-W Columbium-Bearing and J&L "Cor-Ten."

Jones & Laughlin Steel Corporation
3 Gateway Center, Pittsburgh 30, Pennsylvania

WHERE CAN YOU USE THIS SIMPLE FASTENER?

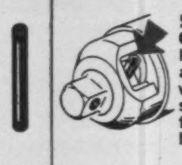
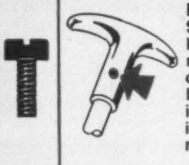
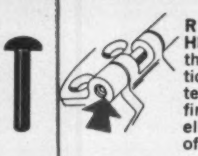
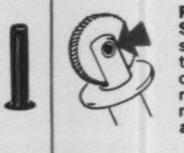
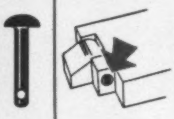
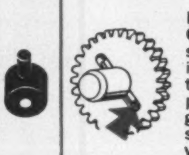
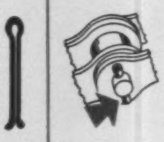
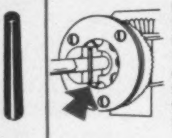
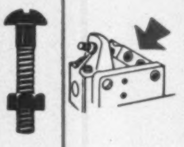


ROLLPIN is the slotted tubular spring pin with chamfered ends that is cutting production and maintenance costs in every class of industry. Drives easily into standard holes, compressing as driven. Spring action locks it in place—regardless of impact loading, stress reversals or severe vibration. ROLLPIN is readily removable and can be re-used in the same hole. Made in carbon steel, corrosion resistant steel and beryllium copper.

WHERE SHOULD YOU BE USING ROLLPINS®?

Thousands of companies—from cigarette lighter makers to car manufacturers—have learned from experience that ROLLPINS not only cut production and assembly costs, but make good products even better! The 9 examples pictured below don't even begin to indicate the range of application and usefulness of this simple, universal fastener. And naturally, they don't begin to show the cost and production savings you can achieve with ROLLPINS. If you aren't using ROLLPINS now, shouldn't you be? Write for a generous sample assortment and complete information. Dept. R62-1177.

ROLLPIN REPLACES 9 DIFFERENT FASTENERS!

 **REPLACING A GROOVED PIN . . .** here Rollpin serves as a stop pin. Its light weight and shear strength function perfectly . . . cuts assembly costs.	 **REPLACING A SET SCREW . . .** a short length Rollpin is self-retained in the handle of an automobile brake. Is readily driven into over-drilled hole in shaft for easy removal.	 **REPLACING A HEADED PIN . . .** in this hinge pin application, constant spring tension holds Rollpin firmly in place . . . eliminates loosening of hinge due to wear.
 **REPLACING A RIVET SHAFT . . .** Rollpin serves as an axle for the sparkwheel of a cigarette lighter. No riveting or threading necessary. Faster assembly.	 **REPLACING A CLEVIS PIN . . .** here Rollpin holds firmly in clevis, permits free action of moving member.	 **REPLACING A HUB ON A GEAR . . .** Rollpin, self-retained in shaft, is simply snapped into molded slot to position sintered gear. Rollpin's shear strength is particularly valuable here.
 **REPLACING A COTTER PIN . . .** Rollpin assembly time is shorter, service life ten times longer. Vibration-proof flush fit. Easily removable.	 **REPLACING TAPER PINS . . .** Rollpin eliminates cost of taper pin reamers and the entire reaming operation. Rollpin costs less than a taper pin and installation is cheaper.	 **REPLACING A BOLT AND NUT . . .** Rollpins act as fasteners and pivots . . . may also be used with a free fit in outer or inner members depending upon product design requirements.

ESNA

ELASTIC STOP NUT CORPORATION OF AMERICA ROLLPIN®

2330 Vauxhall Road, Union, New Jersey

This man...
is running this locomotive

There is no one in the locomotive. The man in the picture can speed up, slow down, stop or reverse this train, *whether he is riding the locomotive or walking, or standing on the ground.* Both he and the locomotive are equipped with a new Union Switch & Signal remote control system for industrial switching locomotives. Because the operator always can be at the best vantage point, blind operations are eliminated and cars are spotted for loading, unloading or dumping more efficiently. This man can put a car *precisely* where he wants it.

You can minimize the hazards involved as freight moves around your plant with this unique remote control system. If you have a special problem such as moving cars into a thawing pit or under a loading chute, use a centrally located console control unit so one man has complete control over the entire operation.

Look over your in-plant locomotive operation and see if it couldn't be made safer and more efficient if the man running the train could always see what he was doing. Check the coupon for our illustrated Bulletin 187 on how our remote control systems can work for you.

Union Switch & Signal
Division of Westinghouse Air Brake Co.
Pittsburgh 18, Pennsylvania

☐ Please send Bulletin 187 on Union Switch & Signal remote control systems.

☐ Please have representative call.

Name____________________

Title____________________

Company____________________

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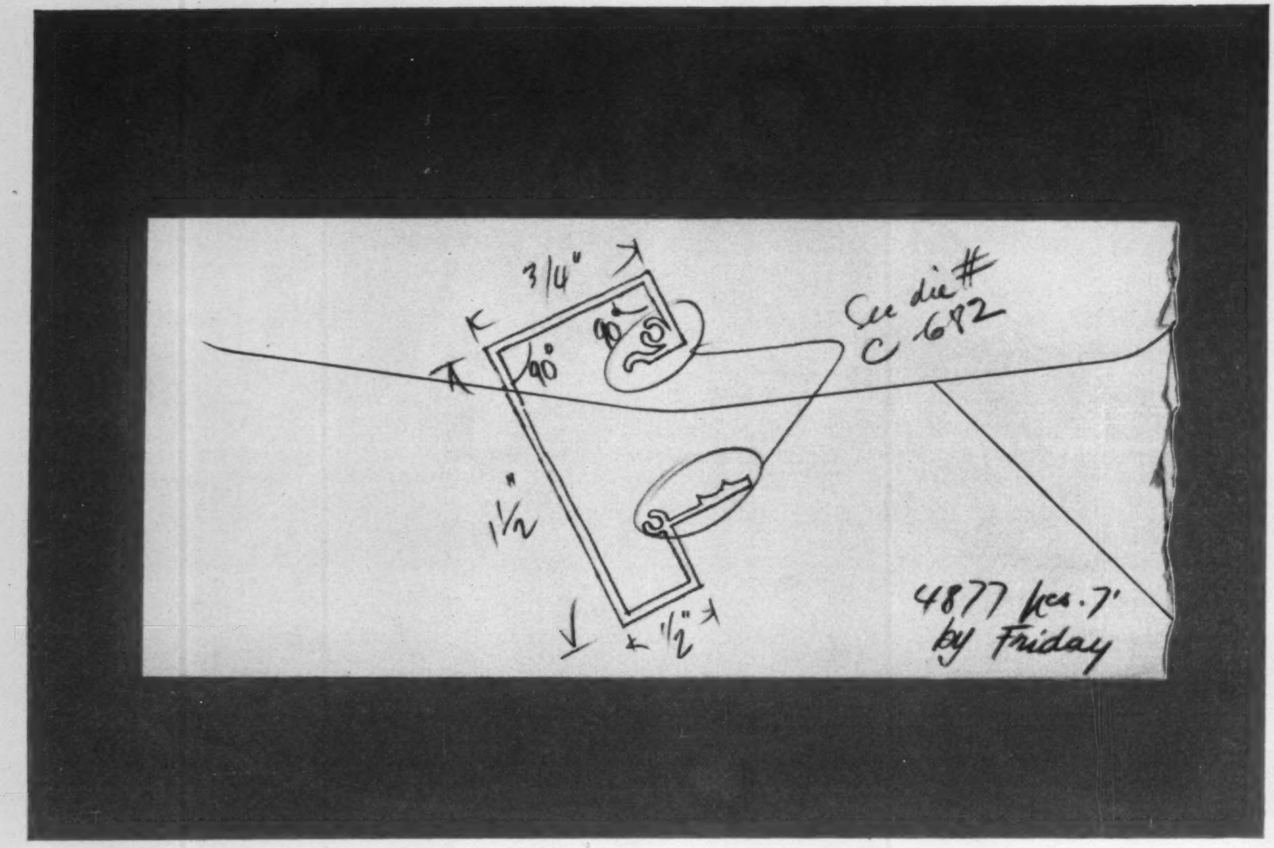
DIVISION OF WESTINGHOUSE AIR BRAKE COMPANY—
PITTSBURGH 18, PENNSYLVANIA
NEW YORK . . . PITTSBURGH . . . CHICAGO . . . SAN FRANCISCO



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with specs on the back of an envelope

YOUR nearby aluminum extruder is geared to provide fast service. Your order doesn't have to be big to be important to him. It doesn't have to wait for hundreds of others. And when it comes from his presses, delivery is quick, because your plant is close to his.

Speed is just one reason, however, for dealing with an independent extruder. *Quality* is another—the consistent quality of a specialist—the consistent quality of a supplier who takes a personal interest in your business.

Service is equally important. Your independent extruder is at hand when you need him. And he has the know-how to analyze

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111 W. 50TH ST., NEW YORK 20, NEW YORK

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5000 high-quality aluminum extrusions

your product line and show whether aluminum extrusions can now replace any costlier parts or assemblies.

You'll find that it's good business to get acquainted with one of these extruder neighbors . . . specialists who are supplied with top-quality aluminum ingot by Aluminium Limited.

ALCAN

Supplying metal and ideas to companies that work with aluminum.

Mail this coupon for Extruder names and addresses:

Aluminium Limited Sales, Inc.
111 W. 50th St.
New York 20, N. Y.

Please send me a list of Independent Extruders in this area.

Name____________________

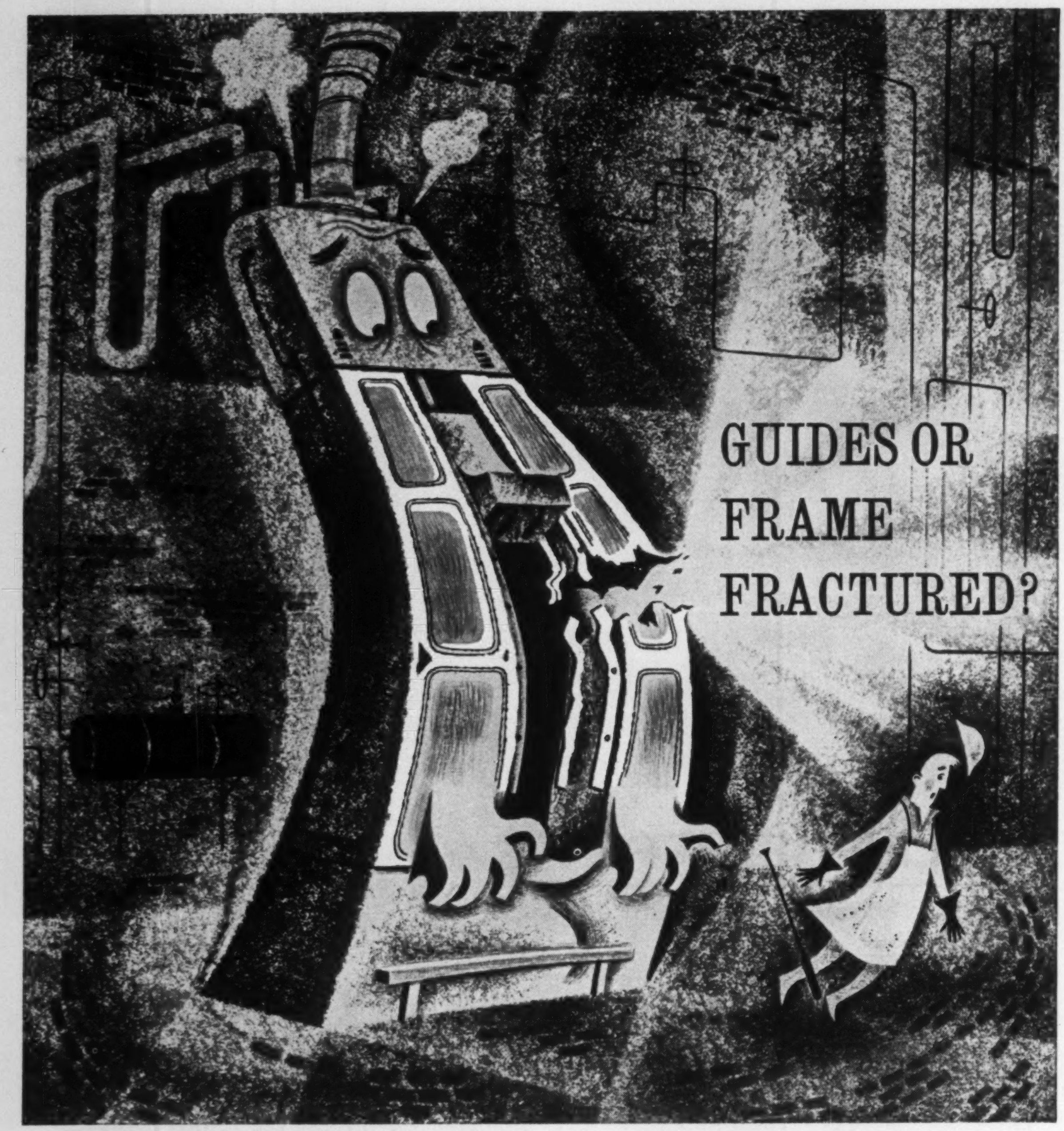
Title____________________

Company____________________

Address____________________

City__________State_____

IA-11



Call ERIE FOUNDRY
for forging hammer replacement parts

Replacement guides, frames, and other parts for a wide variety of forging hammers of most any make are available from ERIE. They are high in quality, competitive in price.

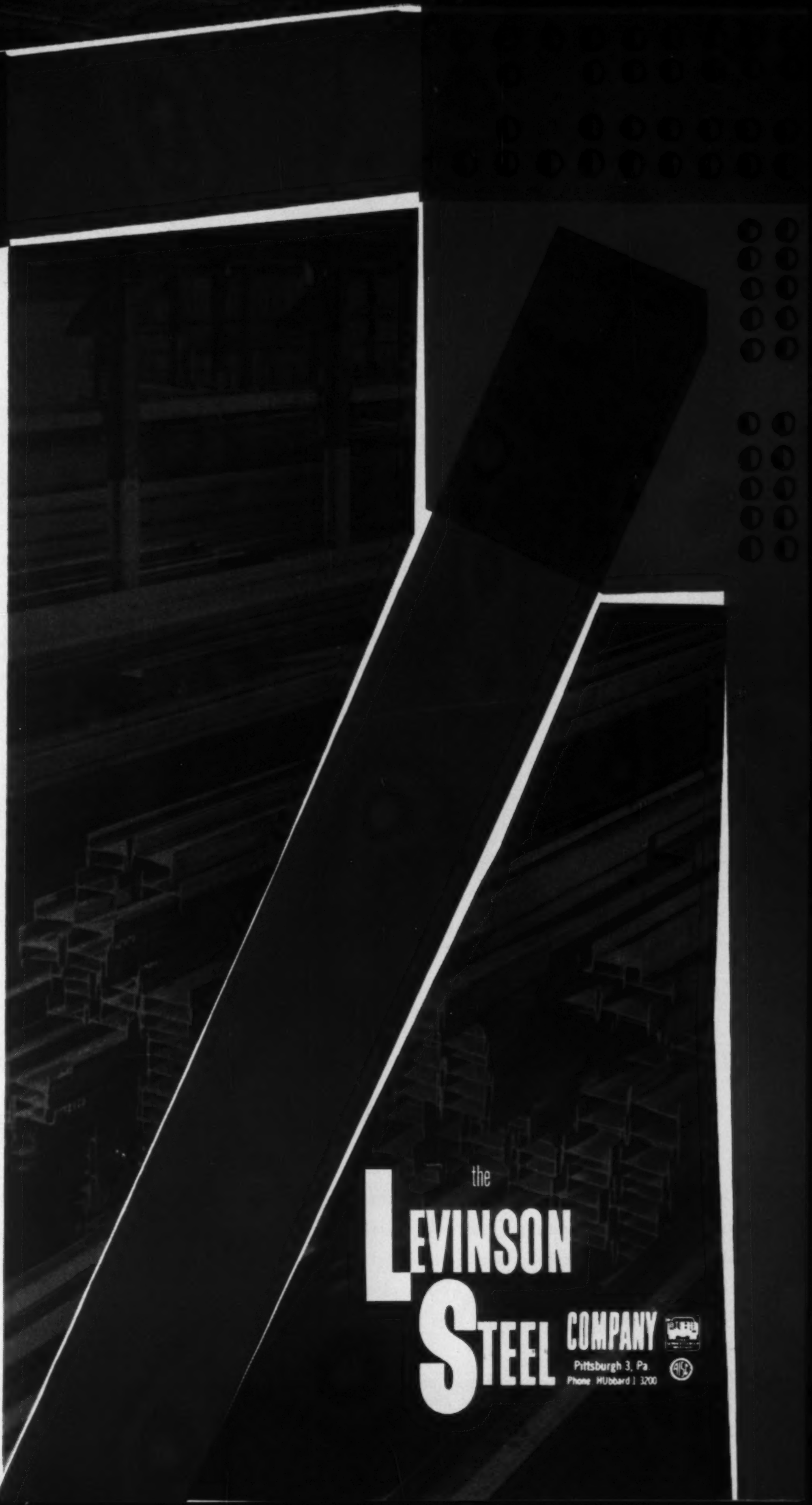
For over 65 years we have specialized in the design, development and manufacture of forging hammers of all types. Logically, then, Erie Foundry is a natural source for repair parts equal in quality and performance to the original equipment. Substantial inventories assure you of prompt service. For more information on repair parts or our complete Hammer Rebuilding Service, write Mr. James Walker.

ERIE

ONE OF THE GREAT NAMES
IN FORGING SINCE 1895

Manufacturers of Forging Hammers • Forging Presses • Hydraulic Presses • Trimming Presses

ERIE FOUNDRY CO., Erie, Pa.

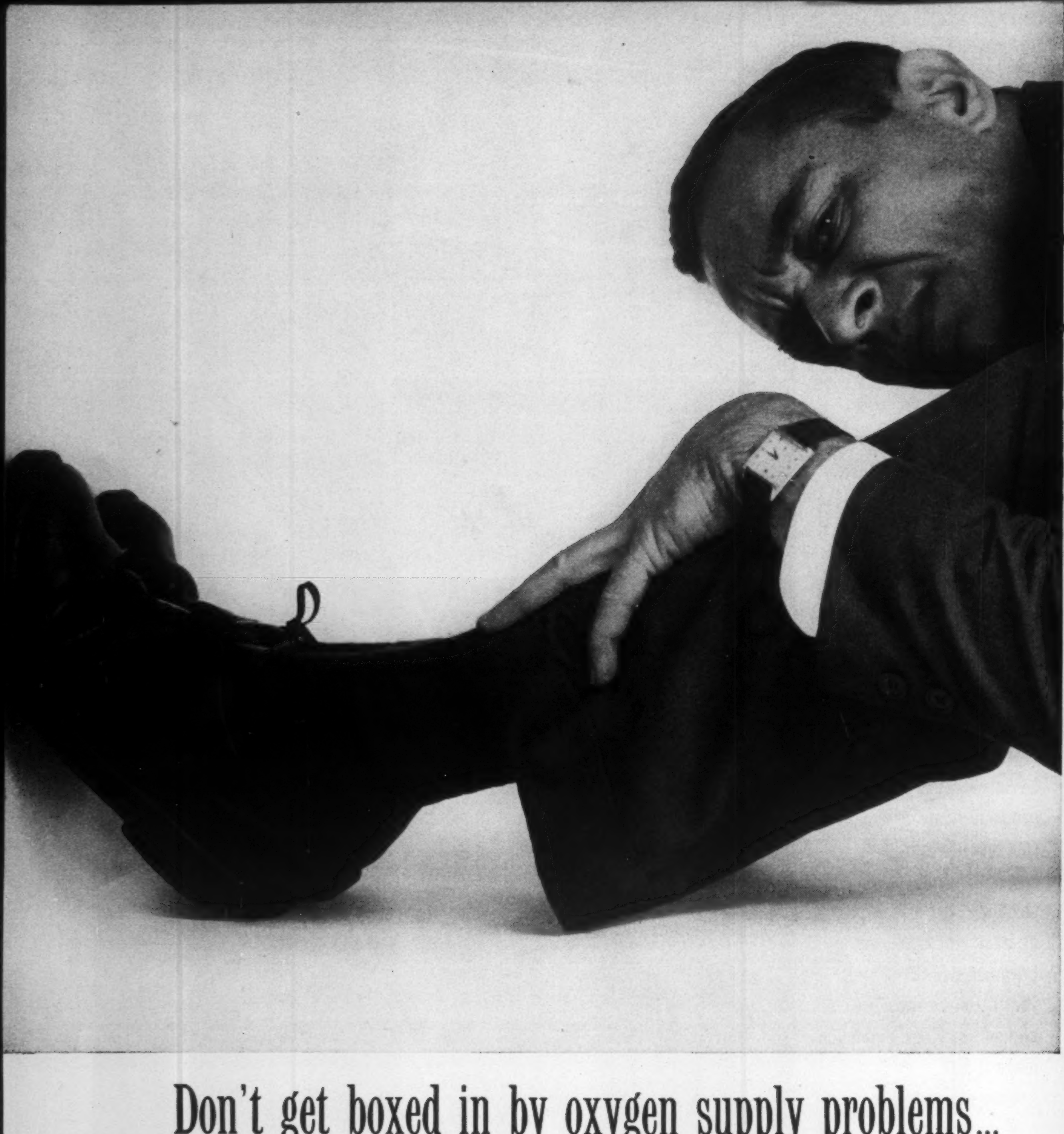


A mile of stockpile

When you need steel fast, whether it's a few 1" bars for a rush maintenance requirement or several hundred tons of highly fabricated structural steel—Levinson saves you precious hours or weeks by drawing from its large, comprehensive stockpile. For either plain or fabricated steel, Levinson will fill your order as specified and on time. Yes, when you leave it to Levinson, you leave it to experience!

Designers, Fabricators,
Warehousers, Erectors
For Over 50 Years.

the
LEVINSON
STEEL COMPANY
Pittsburgh 3, Pa.
Phone HUbbard 1 3200



Don't get boxed in by oxygen supply problems...

Keep your steel operations flexible by removing all uncertainties about oxygen supply with an Airco tonnage oxygen plant. A plant we build and operate for you — on or adjacent to your site — gives you assurance of supply that only an experienced oxygen producer like Airco can guarantee.

GUARANTEED BACK-UP. Your oxygen plant is backed up by Airco's nationwide network of oxygen plants. If the plant is down for any reason, Airco will keep your oxygen flowing from its integrated system. If you need more oxygen than originally anticipated, Airco will supply whatever quantities you require. And you won't be boxed in with a rigid purchase arrangement that can't be adjusted to steel production.

PROVEN TECHNOLOGY. Making oxygen — like making steel — is a specialized business. Airco has 45 years'

let Airco build and operate a plant for you

experience in low-temperature technology . . . design, engineering and construction proficiency that has dotted the country with oxygen plants — including the first on-site oxygen plant for steel. There's no first-plant guesswork . . . late starts . . . long debugging periods that ruin your production schedules.

ASSURED LOW COST. Your oxygen is available fast . . . at a firm, fair price that reflects the economies provided by Airco's large resources and long experience.

For the full oxygen story, write, wire or phone today.

AIRCO®

AIR REDUCTION

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DENISON HydrOILics

16 different VICTOR ADDING MACHINE cases perforated without tooling changes, demonstrates DENISON Multipress...

VERSATILITY

PERFORATING *16 different plastic case designs without tooling changes, this 8-ton Denison Multipress reduces inventory requirements and speeds production for Victor Adding Machine Company, Chicago. Typical case after punching, shown at left.*

SHARPLY REDUCED inventory requirements, no scrap loss and production line versatility are just 3 of the important advantages gained with this Denison hydraulic Multipress at Victor Adding Machine Company.

Previously, stocks of at least 6 different basic plastic shells had to be maintained to produce cases for 16 different models in the Victor Champion line.

Now, with an 8-ton Multipress equipped with special tooling and controls which enable the operator to select a variety of punching combinations automatically, only *two* basic shells are required in stock. And *all* of the 16 different case design variations are perforated on the Multipress *with no change of tooling.* And the right shell is always on the assembly line at the right time.

Smooth, controlled hydraulic power perforates the "Cycolac" plastic, without charring or discoloring. Holes are clean and smooth . . . there's no scrap loss . . . punch life is significantly longer. This operation at Victor Adding Machine is another case-in-point showing how Multipress versatility and usefulness can save time and money in *your* plant. Call in the nearby Denison Production Specialist to discuss how a **M**ultipress **A**nalysis **P**rogram can start to **MAP** production savings for you now.

DENISON ENGINEERING DIVISION
American Brake Shoe Company
1242 Dublin Road • Columbus 16, Ohio

HYDRAULIC PRESSES
PUMPS • MOTORS • CONTROLS

DENISON

HYDRAULIC MULTIPRESS

Think Service . . .

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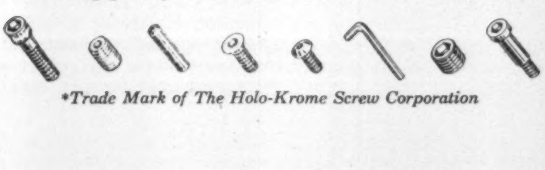
HOLO-KROME REPRESENTATIVES ARE READY TO HELP YOU DESIGN AND MANUFACTURE FOR GREATER PROFIT

To take advantage of the special knowledge that's available to you, call a Holo-Krome representative. He's an expert on top-quality THERMO-FORGED* socket screws and is skilled in all phases of applying them. He'll help you design the best fastener into your product in a way that will keep manufacturing costs at a minimum.

Application assistance, same-day service and cost-reducing quality make Holo-Krome THERMO-FORGED socket screws your best fastener buy. Like full details on how Holo-Krome quality and service can help increase your profit? See your authorized Holo-Krome distributor, or write for more information.

**Trade Mark of The Holo-Krome Screw Corporation*

HOLO-KROME
Thermo-Forged*
SOCKET SCREWS
SOLD ONLY THROUGH AUTHORIZED HOLO-KROME DISTRIBUTORS
THE HOLO-KROME SCREW CORPORATION • HARTFORD 10, CONN.



Cosco Stools, Tables, Carts are . . .

"Made Like A Million" with Pittsburgh Steel Sheet

Make your products "like a million" and you'll sell them by the million.

That's the philosophy practiced at Hamilton Cosco, Inc. of Columbus, Indiana, manufacturer of nationally known Cosco brand tubular steel frame household and juvenile products and office chairs.

And the philosophy has paid off.

Introduced 16 years ago, Cosco household stools have averaged nearly a million units a year. Their success led to development of other popular Cosco products ranging from baby jumpers to executive office chairs.

Pittsburgh Steel Company plays an important part in Hamilton's success by supplying substantial quantities of cold rolled sheet that consistently meet Cosco's ultra-critical requirements.

For, at Hamilton there's no such thing as a "second" in a finished product, be it serving cart or stool, playpen or folding bridge chair. The slightest imperfection — in forming, bending, painting or plating — requires reprocessing or scrapping of the defective item.

Supplying cold rolled sheet that faithfully meets such air-tight quality control places unusual responsibility on the steel supplier.

But, Pittsburgh Steel regularly meets this obligation with sheet known throughout the metalworking industry for its three "F" qualities:

- **Flatness** — for exposed surfaces where appearance is vital and for fast production on automatic and semi-automatic equipment.
- **Finish** — dense, exceptionally clean surface for critical finishing operations, particularly Hamilton's electrostatic painting process.
- **Formability** — for precise uniformity in stamped, drawn, rolled or bent shapes; and especially for non-fluting characteristics in difficult bends on electric-welded tubing rolled

◀ The three "F" features of Pittsburgh Steel sheet—**flatness, finish, formability**—show up in assembly of the popular Cosco "Hour Glass" step stool. Gleaming backrests, gracefully curved tubular legs and brackets, seat pans and fold-away steps, all reflect quality of Pittsburgh cold finished sheet.

Flatness of Pittsburgh cold rolled sheet is critical for appearance, rigidity of stool seat and for trouble-free production in long runs. Here, after forming and piercing, raw edges are turned under.

Formability of Pittsburgh Steel sheet is demonstrated here as ¾ inch tubing, rolled from slit sheet, takes severe bends and deformation required for backrest brackets. Non-fluting quality of steel on radius of bends is vital on this and all other tubular parts produced by Hamilton Cosco, Inc.

Finish of Pittsburgh Steel sheet provides dense, exceptionally clean surface for tight, smooth paint adherence required by Hamilton's electrostatic painting process. Seat pans for Cosco's unique gatefold card table chairs show painting quality of steel.

from Pittsburgh Steel sheet.

H. E. Spurgeon, purchasing agent, said:

"The company's success is based on its insistence on absolute quality of its products—and that means quality starting with raw steel. We do many things merely because it's the best way.

"Performance of Pittsburgh sheet is very good, we've found. Over-all, I'd say Pittsburgh Steel is a very satisfactory supplier."

Pittsburgh Steel Company sheet—the steel with the three "F" qualities—can help step up your product quality, too, whether you're using hot rolled or cold rolled, sheet widths or strip widths. Contact one of the Pittsburgh Steel Company District Offices listed here. We'll match the steel to your product.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

Atlanta
Chicago
Cleveland
Dallas
Dayton
Detroit
Houston
Los Angeles
New York
Philadelphia
Pittsburgh
Tulsa
Warren, Ohio

When the job calls for DIAMONDS...sell SIMONDS

SIMONDS DIAMOND WHEELS

made with extra care for extra value

man-made or natural diamonds

SIMONDS ABRASIVE CO.
DIAMOND WHEEL
Max. RPM
Order No.
SIMONDS ABRASIVE CO.
DIAMOND WHEEL

You get *extra* use from Simonds wheels because more of the diamonds are *productively* used for actual grinding. That's due to the extra care that goes into their manufacture . . . extra-demanding quality controls, modern techniques and the most accurate equipment . . . extra care that provides better balance and truer running, and consequently, fewer dressings. Special core material in resinoid bonded wheels also needs little or no dressing back as the diamond depth is consumed. Made with true and exact concentrations, and available in all shapes, sizes and bonds. Job-proved grain and grade specifications.
Send for catalog ESA-290.

SIMONDS
ABRASIVE CO.

Tacony & Fraley Sts.
PHILADELPHIA 37, PENNA.
Division of Simonds Saw and Steel Co.

INDUSTRIAL DISTRIBUTORS • THE RIGHT HAND OF PRODUCTION

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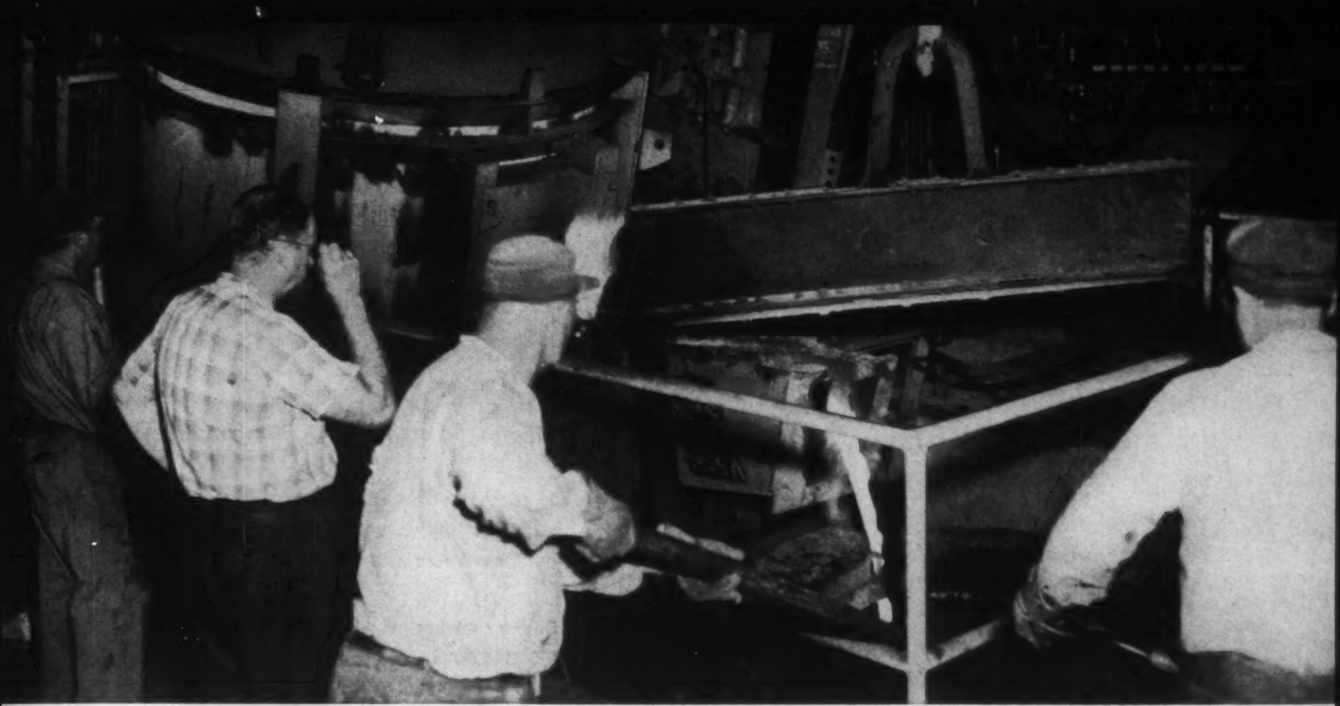
SHREVEPORT—IN CANADA: GRINDING WHEELS DIVISION, SIMONDS CANADA SAW CO., LTD., BROCKVILLE, ONTARIO • ABRASIVE PLANT, ARVIDA, QUEBEC



"Electric arc melting gives us improved metallurgical quality at an economic advantage," says Birdsboro Corporation.

Steel castings provide a wide range of selective materials, both as to chemical analysis and mechanical properties, which are suitable for application in various service and environmental conditions. The recent selection by Birdsboro Corporation of two new electric arc furnaces to replace open hearths and to complement existing arc melting facilities has contributed markedly to diversification of their steel foundry operations to meet these requirements.

Demand has been matched with flexible melting capacity through installation of two Heroult Electric Arc Melting Furnaces:

Shell Size	Capacity	Melting Rate
8-foot	10-ton	2 tons per hour
13.5-foot	30-ton	7 tons per hour

These two furnaces increase total electric melting capacity to 300 tons per day.

Service to customers was the primary requisite in Birdsboro's selection of this equipment. In addition, sales possibilities have increased, quality of metal is superior, alloy recovery is higher, maintenance is reduced, and man-hours per ton is lower. Result—steady improvement of steel melting costs.

American Bridge constructs furnaces for all types of arc melting, in charge capacities to over 200 tons. You can select door-charge or swing roof top-charge types. Your crew can easily maintain a Heroult furnace.

If you're after melting flexibility, increased production, and lower costs, check American Bridge's complete design, construction and installation service.

USS is a registered trademark

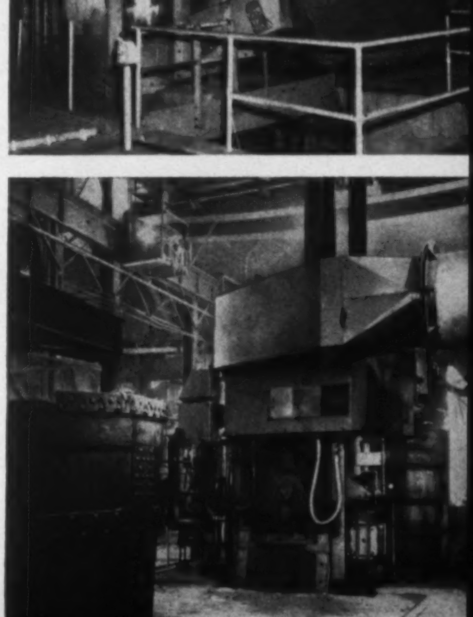
General Offices: 525 William Penn Place, Pittsburgh, Pa. Contracting Offices in: Ambridge • Atlanta • Baltimore Birmingham • Boston • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Elmira • Gary • Harrisburg, Pa. Houston • Los Angeles • Memphis • Minneapolis • New York • Orange, Texas • Philadelphia • Pittsburgh Portland, Oregon • Roanoke • St. Louis • San Francisco • Trenton • United States Steel Export Company, New York

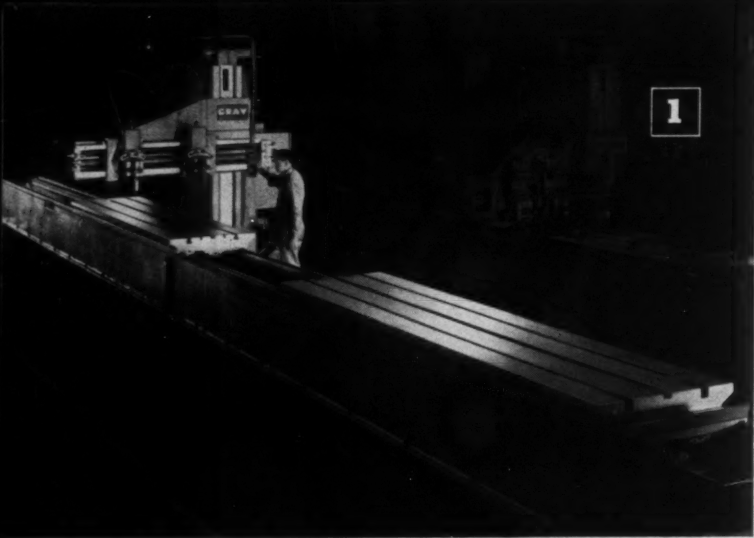
American Bridge
Division of
United States Steel

USS

Steel

This mark tells you a product is made of modern, dependable **Steel.**

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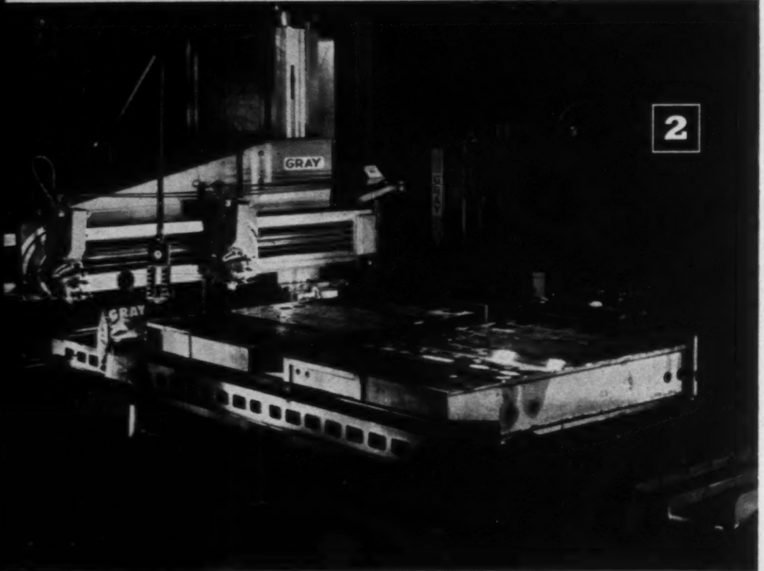
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These GRAY machines feature simplified operation, rugged dependability and great precision. Their high speed, power packed performance removes metal faster and more economically. They pay for themselves by increasing your production, lowering operating costs, reducing downtime.

1. **Gray flying scot planer.** Most economical universal high speed planer ever built ▪ Basic machine 30″ x 6′ ▪ Table speed range 30-300 F.P.M. ▪ Model shown is 42″ x 28′ with duplex table.

2. **Gray universal planer.** Size 108″ x 84″ x 28′ ▪ Cuts both ways, out performs a milling machine on flat surfaces with less tool cost.

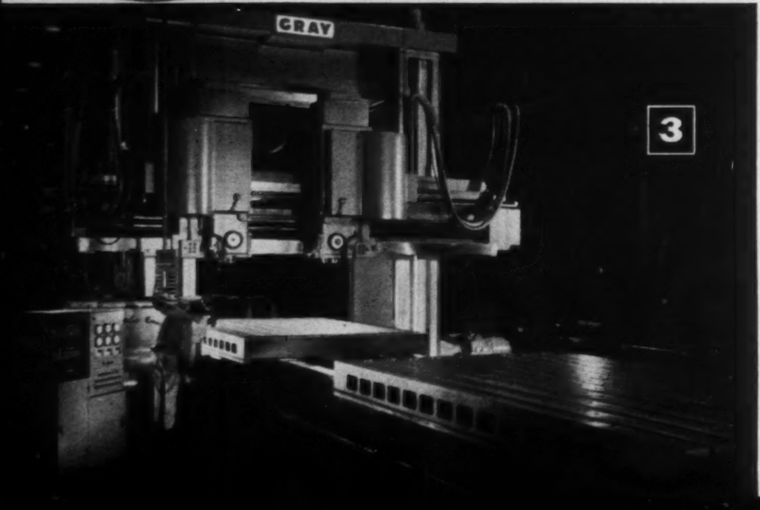
3. **Gray milling machine—planer type.** Size 108″ x 108″ x 30′ ▪ Has 10″ quill, 75 H.P. non-swiveling rail head ▪ Width between housing 123″ ▪ Phase I Space-setter visually shows where you are.

4. **Gray horizontal boring, drilling, milling machine.** Has 6″ dia. nitralloy bar, 60″ bar travel ▪ 72″ vertical head travel ▪ 50 H.P. spindle motor ▪ Phase III Space-setter, point to point positioning on two axis rails, runway and column.

Specific bulletins available on all machines on request from

THE G. A. GRAY CO. / CINCINNATI 7, / OHIO

GRAY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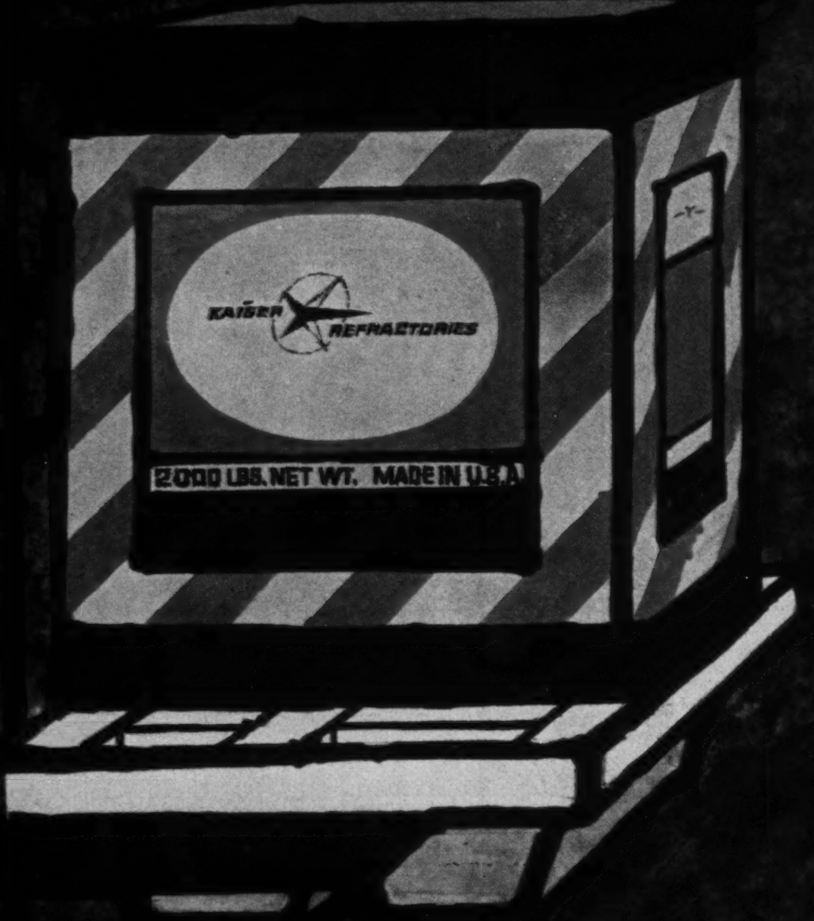
consistently purchased

4

GRAY
GRAY
GRAY

by companies who know QUALITY doesn't cost

it pays!


KAISER REFRACTORIES
2000 LBS. NET WT. MADE IN U.S.A

NEW! FAST-DUMPING

KAISER-PAK*

ELIMINATES 33 SACKS PER PAK!

. . . delivers one ton of Kaiser ramming mix or gunning grains as fast as you can pull two tabs! Kaiser-Pak is Kaiser Refractories' new palletized, moisture-proof carton. Pull one rip tab at its bottom—and a half-ton of material pours neatly between the forks of your lift. Pull the other and you've dumped a measured ton. Time: about one minute.

Each Kaiser-Pak eliminates lifting, ripping, dumping 33 sixty-pound or 20 hundred-pound sacks!

For more information about this new contribution to customer service, ask your Kaiser Refractories Sales Engineer—or write Kaiser Refractories:

OAKLAND 12, CALIF. . . . . 300 LAKESIDE DRIVE
MEXICO, MISSOURI . . . . MEX-R-CO BUILDING
PITTSBURGH 22, PA. . . . . 3 GATEWAY CENTER

(Canadian Subsidiary: Refractories Engineering & Supplies, Ltd.)

KAISER REFRACTORIES

*T. M. KAISER ALUMINUM & CHEMICAL CORPORATION

Snowplow chews up avalanches at 36 tons a minute

How steel with Nickel in it delivers the brawn behind the bite

Chewing through mountainous drifts to rescue a snow-bound town, this plow can devour 2,200 tons of snow an hour.

It bites through solid ice and deep snow. Or strips a new-fallen six-inch blanket from a superhighway at 30 mph.

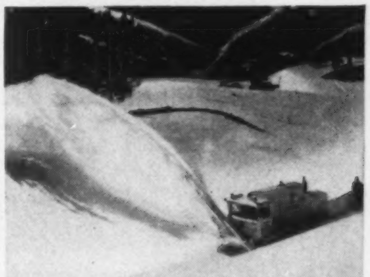
Drive shaft and gears run a gauntlet of shocks as the plow churns through rocks and stumps buried under stone-hard snow. That's one big reason why two nickel alloy steels, AISI 4320 and 3140, are used for these heavily stressed transmission parts.

Nickel gives steel the strength and toughness essential to a snowplow's drive shaft that must perform under brutal wrenching, twisting shock loads in arctic cold.

Putting stamina where it counts is just one of the things you can do with Nickel. In addition to providing muscle, Nickel can also help alloys withstand the intense heat generated by supersonic flight. Or shrug off the deep cold of liquid helium. And every industry knows the value of Nickel in combatting corrosion.

When you have a metal problem, look into the possibility that Nickel or one of its alloys might be the answer. Write for our "List A." It tells you of technical literature helpful to all industries. A copy is yours on request.

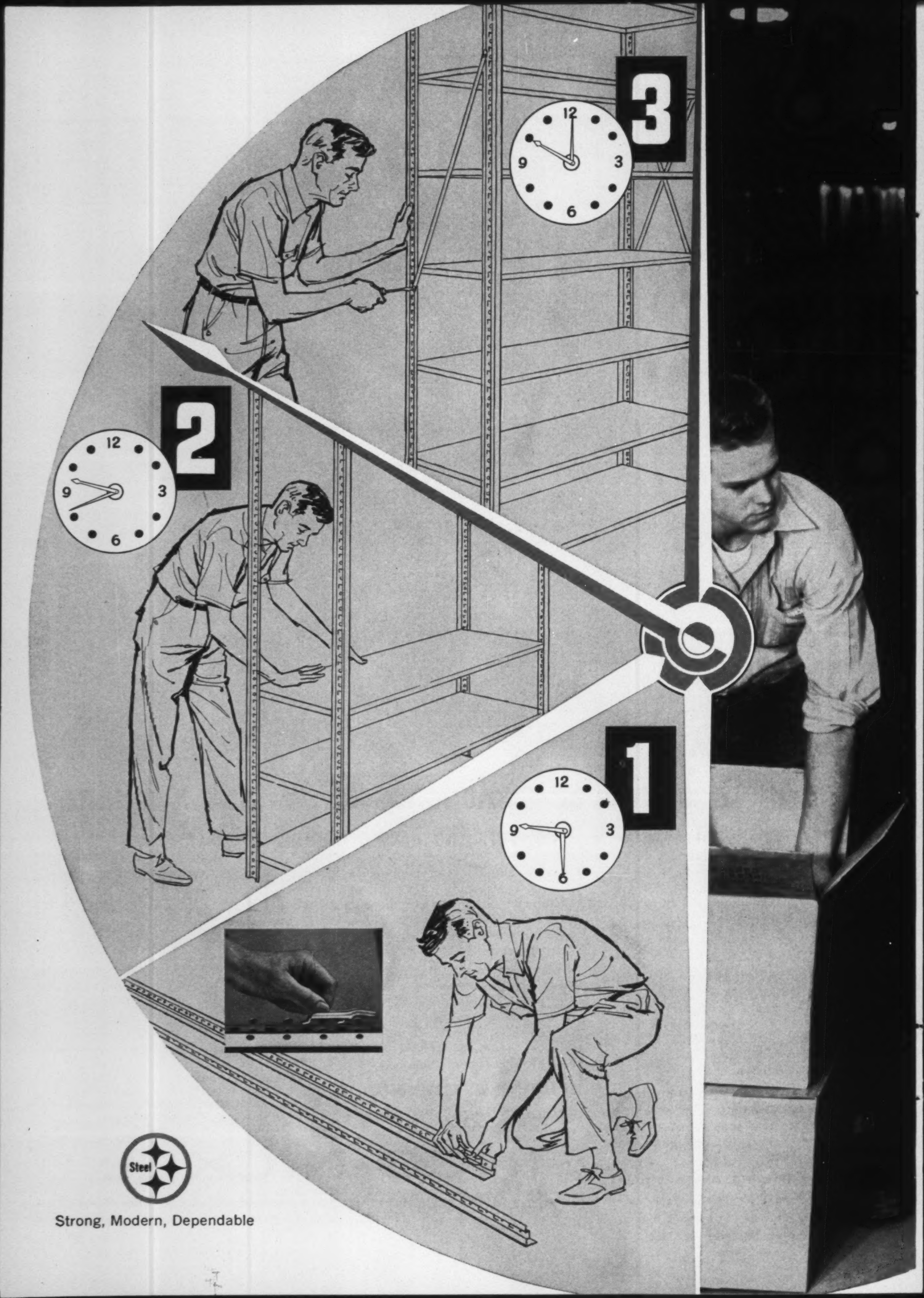
THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street INCO New York 5, N. Y.



Transmission shafts are made of AISI 4320 nickel alloy steel. Drive and spline bushings are AISI 3140. Snowplow by American Snowblast Corp., Denver, Colorado.

INCO NICKEL

NICKEL MAKES ALLOYS PERFORM BETTER LONGER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Steel

Strong, Modern, Dependable

MORE SHELF SPACE IN MINUTES!

REPUBLIC CLIP SHELVING

Open a package of Republic Clip Shelving components and you have everything you need to get "engineered" storage space in minutes! No special tools needed . . . and the completely interchangeable parts go together, fast, in whatever storage arrangement you want.

Here's how it works:

1 Lay out two angle posts. Slip Republic Compression Shelf Clips into first and second slots from bottom. (Finger pressure alone puts the clips in place . . . no tools needed.) Place end flanges of first shelf over clips and tap into place with the heel of your hand. Now add two posts at the front, again tapping the shelf down over clips.

2 Stand the assembly upright. Place shelf clips at desired shelf levels. Slip shelves into place, installing top shelf last, flush with post tops.

3 Attach back sway braces and side sway braces . . . and your new, "tailored" shelving is ready for use! Average erection time for a single unit—thirty minutes!

The complete line of Republic Clip Shelving includes shelves, parts, and accessories for every storage need, standard or special . . . and you can rearrange Republic Clip Shelving just as fast and often as your needs change! Another big advantage, individual shelves can be moved without disturbing adjacent shelves.

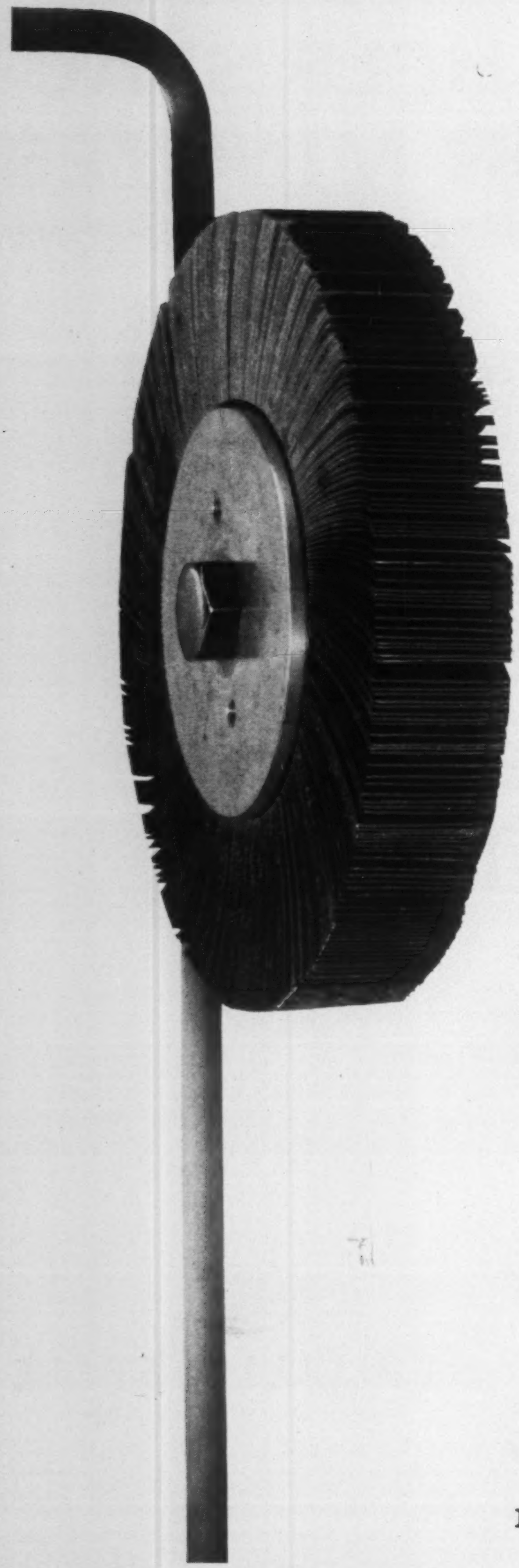
When you need more shelf space, and you need it in a hurry, remember Republic Clip Shelving. You can get it in a hurry too, from your local Republic distributor. Call him, or send the coupon for literature.

REPUBLIC STEEL
Berger Division • Canton 5, Ohio

We're interested in "instant storage" with Clip Shelving. Send literature.

REPUBLIC STEEL CORPORATION
DEPT. IA-2742
1441 Republic Bldg. • Cleveland 1, Ohio

Name________________Title________
Company________________________
Address_________________________
City__________Zone___State________



3MAGINATION
in GRINDING
and FINISHING

"PG" WHEEL REDUCES FINISHING TIME 50%

Stainless steel sink frames, manufactured by R. D. Werner Co., Inc., Greenville, Pa. are satin finished in half the time using the "PG" Wheel. Recommended by a 3M representative to replace a previous method, this unique 3M abrasive tool has practically eliminated rejects while producing a more consistent final finish.

COST CHECK
5-4-5

Why not let 3M's new COST CHECK 5-4-5 Program help you to effectively investigate ways to lower costs and increase production. Discover . . .

- If your grinding can be done more economically
- If your finishing is as efficient as possible
- If your polishing can be done faster and better

Send today for a free COST CHECK 5-4-5 Review Form without obligation. Put 3M's years of abrasive know-how at your disposal. Write: 3M Company, 900 Bush Avenue, St. Paul 6, Minn. Dept. AAS-111.

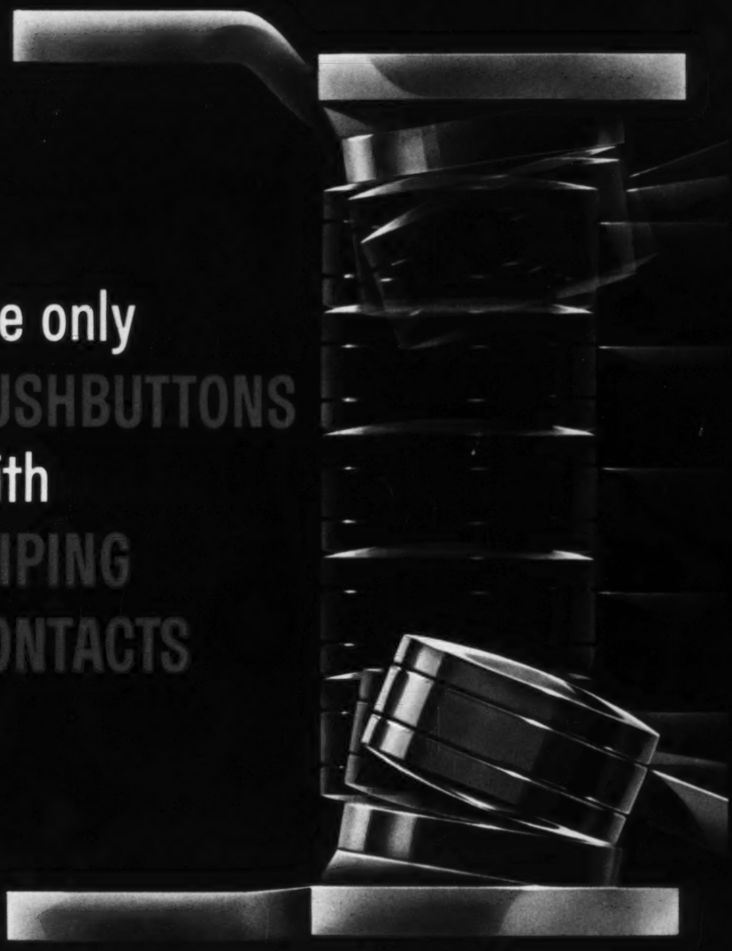
3M COATED ABRASIVES

"3M" AND "PG" ARE REGISTERED TRADEMARKS OF 3M CO., ST. PAUL 6, MINN.

MINNESOTA MINING AND MANUFACTURING COMPANY
. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

the only PUSHBUTTONS with WIPING CONTACTS



STANDARD PUSHBUTTON

AUTO
OFF
HAND

SELECTOR SWITCH

PUSH-TO-TEST LIGHT OR LIGHTED PUSHBUTTON

PILOT LIGHT

Touch a finger to any Clark pushbutton, and there's positive response *every* time.

Why are Clark control units more dependable than others? Because, with each operation, the fine silver contacts are cleaned. The rolling, wiping action between the movable and stationary contacts as they make or break the circuit, wipes off any dust or non-conducting film that may be present. It's a Clark exclusive.

But this is only one of many features that make Clark pushbutton units the most reliable and versatile on the market. Ask your Clark distributor or sales representative to show you how the sturdy construction, ease of wiring and maintenance, and flexibility will help solve *your* pushbutton problems. 61PB2

COLORS? YOU NAME IT, WE'VE GOT IT! You can select from seven different colors for your pushbutton operators, lenses and ferrules. Groups of related control units can be coded by ferrule color, specific functions by operator color—another Clark original to help simplify otherwise complicated control stations. With Clark's complete line of control units, utilizing interchangeable operators, ferrules and nameplates, you have a virtually unlimited number of combinations of electrical functions and colors from which to choose.

THE CLARK CONTROLLER COMPANY

MAIN PLANT: CLEVELAND, 10 • **WESTERN PLANT:** LOS ANGELES, 58
IN CANADA: CANADIAN CONTROLLERS, LIMITED, TORONTO, ONTARIO

LINDE ELECTRIC WELDING

PLASMARC

New...very-thin, fused deposits with controlled dilution New...high-speed, dross-free cuts in 5-in. thick metals

LINDE, inventor of plasma arc processes, announces *new* PLASMARC weld surfacing and *advanced* PLASMARC cutting. What is plasma arc? It is a flow of gas forced through an electric arc, constricted in a small-bore torch nozzle, and accelerated to form an intense jet. It combines electrical heat with the latent heat of highly-excited ionized gas atoms to reach one of the highest known metal-working temperatures (30,000° F.). It will melt any known metal.

A TRUE WELD

PLASMARC *weld surfacing* is true welding—not coating or plating—achieved by feeding powdered metal through the plasma arc into a weld puddle which freezes to form the deposit. Its precision eliminates excess buildup—ideal for such parts as valves, plowshares, seals . . .

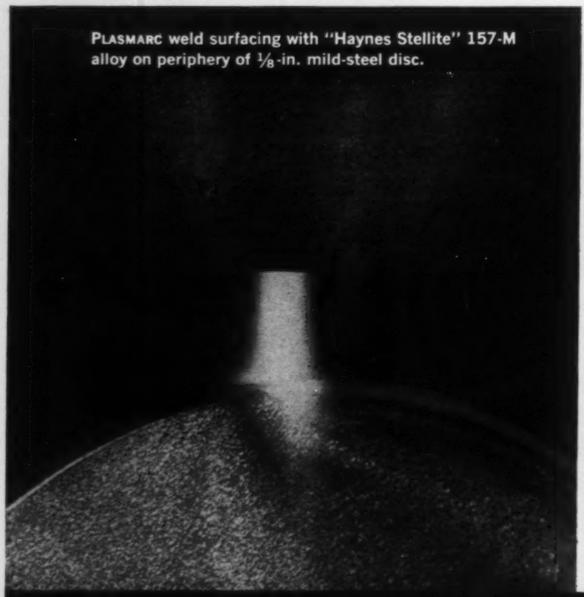
PLASMARC weld surfacing gives precise control of penetration of overlay metal into base metal—as little as .005 in. or higher. Gives precise control of dilution with base metal—from 5% up to 50%. Provides one-pass deposits as thin as .010 in., as thick as 3/16 in., with a wide range of metals and alloys. Produces widths from ⅛ in. to 1 in. or more, speeds over 20 ipm at 95% deposition efficiency, flatter and smoother deposits than other fusion processes.

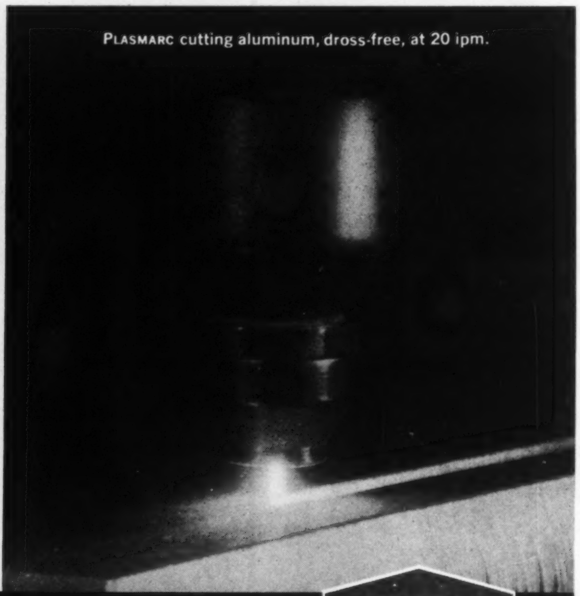
4000 FT./SEC. VELOCITY

PLASMARC *cutting* uses a near-sonic velocity plasma jet (4000 ft./sec.). It easily melts-and-forces a narrow kerf through both ferrous and non-ferrous metals with little or no change in metallurgical properties. After six years' success, it is replacing shearing, sawing and powder cutting—slower methods which often require machining of the cut edge.

PLASMARC cutting has been further developed—heavy-duty equipment, higher current capacity—to handle increased metal thicknesses. It cuts aluminum, magnesium and copper up to 5-in. thick and stainless steel up to 2 in. thick, dross-free. It clean-cuts 4-in. thick stainless, nickel, carbon steel (requires no iron powder), "Monel," "Inconel," cast iron, high-alloy and clad steels. It makes precise, high-speed cuts up to 300 ipm, holds tolerances to 1/16 in., leaves a heat band as thin as .006-in. wide.

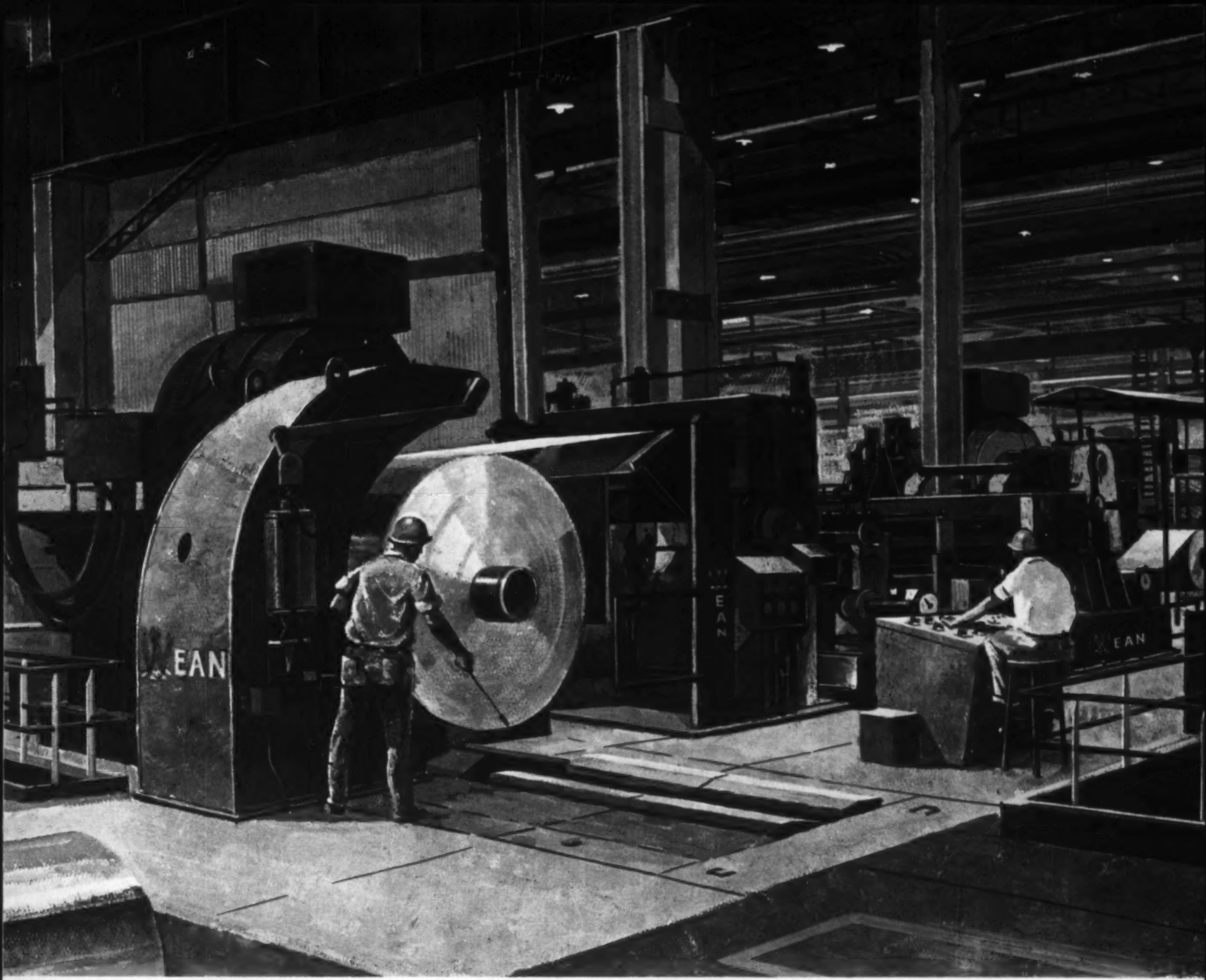
Get full details . . . see a "live" PLASMARC demonstration. Contact your local LINDE office or write direct.


PLASMARC weld surfacing with "Haynes Stellite" 157-M alloy on periphery of ⅛-in. mild-steel disc.


PLASMARC cutting aluminum, dross-free, at 20 ipm.

LINDE COMPANY
Division of Union Carbide Corporation
270 Park Avenue, New York 17, N. Y.

UNION CARBIDE



PORTRAIT OF PROGRESS: *Wean Coil Preparation Line at Weirton Steel Company, Division of National Steel Corporation*

Weirton Increases Efficiency of Tinning with Wean Coil Preparation Line

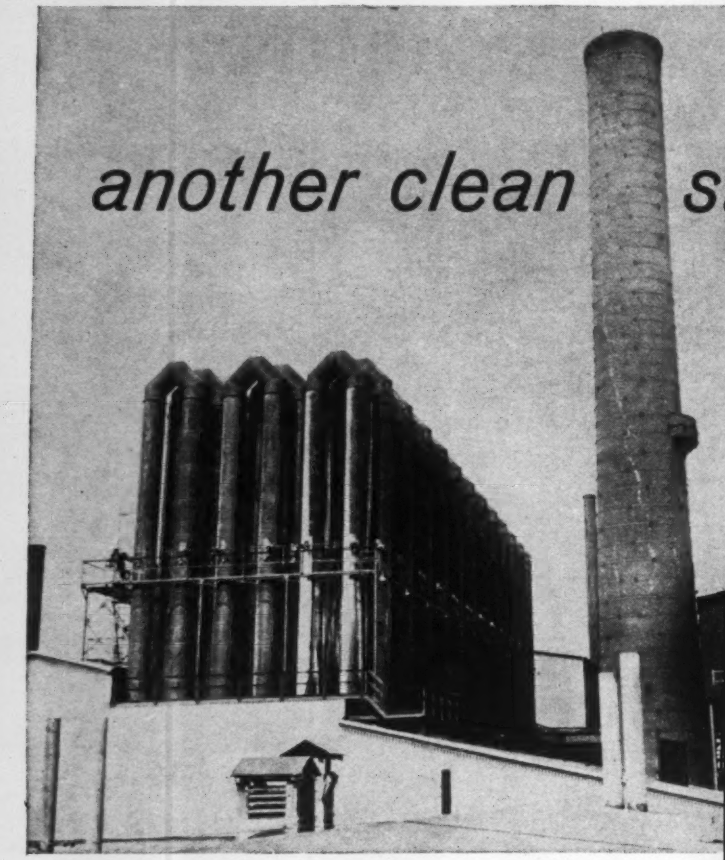
The trend toward purchase of tin plate in coil form has placed increased emphasis on the production of uniformly high quality coils. To assure this uniformity in the end product, Weirton Steel Company has installed this high-speed Wean side-trim and recoil line to prepare coils for the tinning operation. The line side trims tin plate stock and builds up larger, more evenly wound coils for more efficient operation of the tinning lines.

This tension-type line has a maximum speed of 4,000 fpm and is able to handle 60,000 lb. coils 18″ to 45″ wide. Maximum inside diameter of the coils is 16½″; outside diameter, 85″.

More efficient continuous coil processing has been the primary goal of Wean's engineering research for over 30 years. Why not use modern Wean technology to help you in increasing the efficiency of your continuous processing facilities.

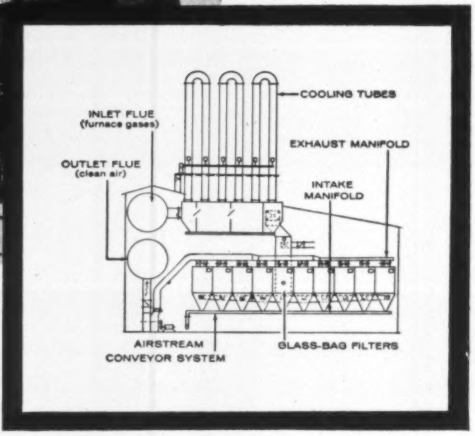
THE WEAN ENGINEERING COMPANY, INC. · WARREN, OHIO

another clean stack



(Left) Cooling tubes atop Glass-Bag Filter housing lower furnace gas temperature from 800°F. to 450°, a full 150° below maximum advisable operating temperature. Clean stack proves that filter removes all visible dust.

(Below) System consists of 12 ten-compartment Glass-Bag Filters. Gases at 800° are blown from electrostatic precipitator to cooling tubes which discharge to filter system, resulting in daily collection of about 35 tons of material.



..."trade mark" of the Dracco Glass-Bag Filter

Freedom from hot, corrosive dust created by metallurgical processes is one of the many benefits of using Glass-Bag Filters. The clean stack shown in the unretouched photograph testifies to the effectiveness of the Dracco system at Hudson Bay Mining & Smelting Co., Ltd., Flin Flon, Manitoba.

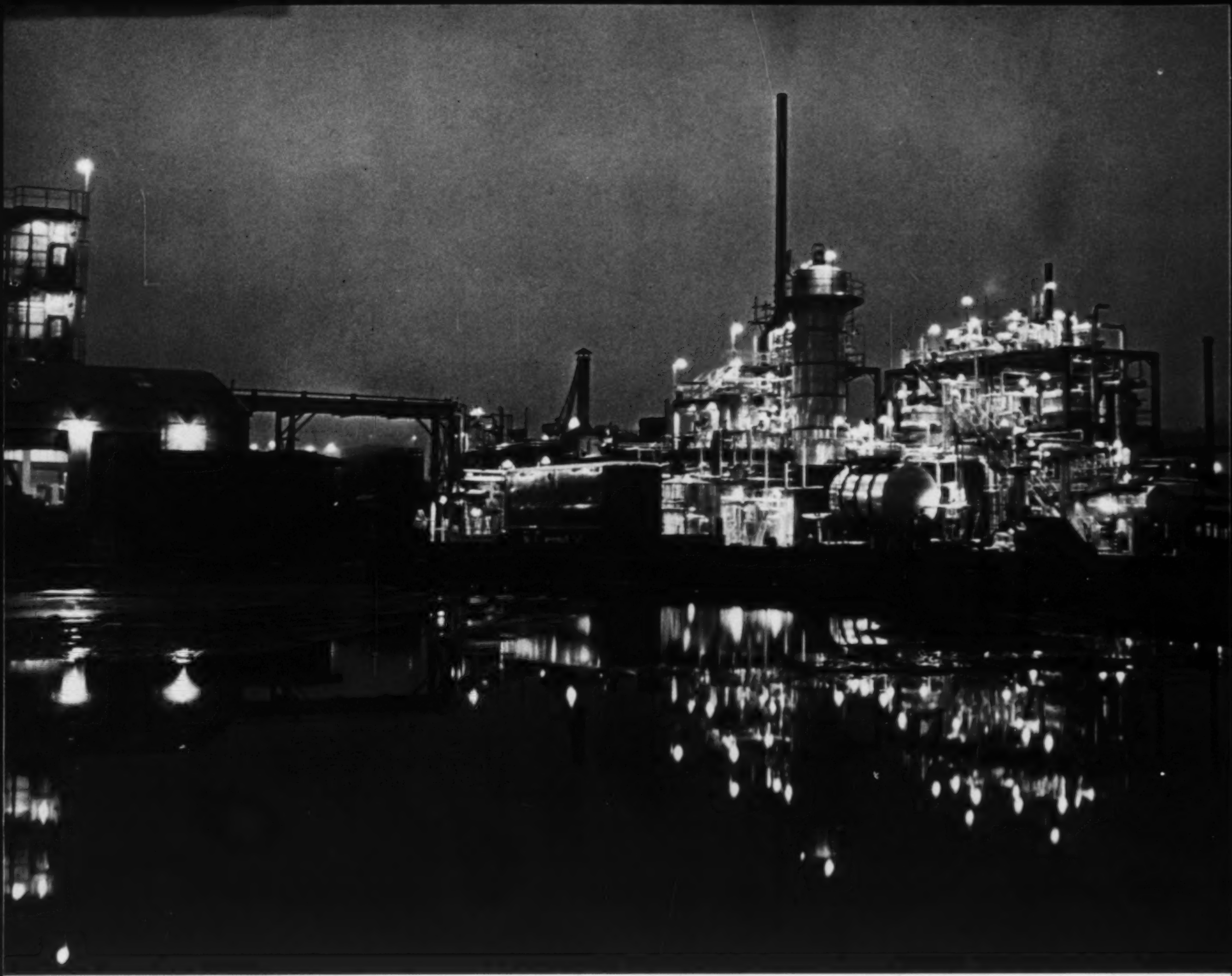
Here is what the system does for Hudson Bay:

- **handles 450,000 cfm of mixed reverberatory furnace and converter gases at 450°F.**
- **recovers approximately 35 tons of valuable metal oxide dusts daily.**
- **maintains operating temperature to prevent condensation of exhaust gases and formation of corrosive acid dews.**
- **eliminates air pollution**
- **reduces cooling equipment requirements, and costs, by 50% over conventional methods.**
- **provides low-maintenance operation and gentle bag cleaning with SWING-CLEAN.**

Glass-Bag Filters, the most advanced equipment now available for fighting air polution and hot dust, have been proved-in-performance in the metallurgical, chemical and cement industries. Virtually 100% collection efficiency is maintained at temperatures to 600°F. Maximum bag life is assured by either of two patented cleaning devices: (1) a mechanism for dust removal by sonics and (2) SWING-CLEAN, gentle swaying action.

For full details on how Glass-Bag Filters can help you lick that hot dust problem, write: Dracco Division of Fuller Company, Harvard Avenue and East 116th Street, Cleveland 5, Ohio.

DRACCO *airstream* conveyors
dust control equipment



New Neville Island maleic anhydride plant, Pittsburgh Chemical Co.

$6,000,000 an hour night and day...

That's what the Chemical Processing Industries will spend in 1961 . . . every hour, every day. And a sizable chunk of it will wind up in equipment, much of it stainless steel, of course. For stainless is the one metal that can stretch the life span of new equipment beyond mere recovery of the initial investment.

This deceptively simple truth is highly important in an industry where process obsolescence is probable in 10 years or less, where a new process must pay for itself, and quickly . . . without expensive maintenance, without revenue loss from contaminated product, without loss of production from repeated equipment failure.

And if stainless is the logical design material among engineers and process chemists, Allegheny Ludlum is their logical supplier. For *no* producer has greater stainless knowledge . . . or shares it more readily. *No* producer supplies the complete range of stainless grades, product forms, and finishes offered by Allegheny Ludlum. And *no* producer is ready to match A-L's service in product development, or to apply the time and talented manpower to the industry's production and application headaches.

In the Chemical Processing Industry . . . as in every other market for stainless steel . . . to those who know, stainless means Allegheny Ludlum.

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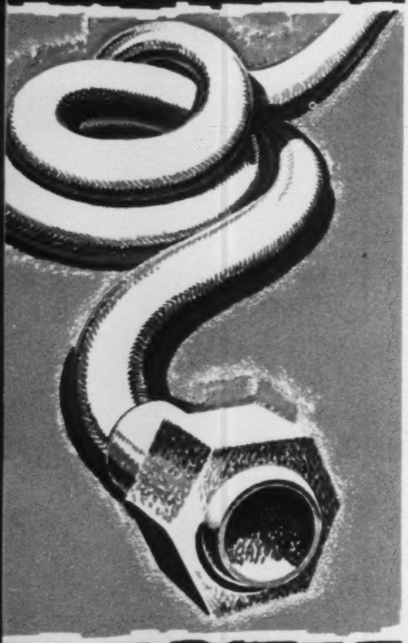

Allegheny Stainless . . .

for every form of Stainless

PIPE & TUBING—seamless, welded, or metallurgically bonded composite products, and the widest range of standard stainless types and special, high temperature alloys in the business. And A-L maintains a large, flexible stocking program of finished products, plus semi-finished billet and strip inventories for you. **SHEET & STRIP**—the quality standard of the stainless industry. A-L's integrated facilities and tight process controls insure identical analyses on every shipment, plus a gage rolled right on the button . . . order after order. And Allegheny Ludlum has earned a reputation as the mill source with thousands of tons of sheet and strip in stock, much of it at finish gages for overnight delivery. For polishing quality, for second-to-none formability, for the lowest fabrication rejection rate and the highest on-time delivery record . . . *nothing* can approach the sheet and strip by Allegheny Ludlum. **WIRE**—stainless in one of its most useful forms . . . for woven belting, baskets, and screen cloth, for cold headed fasteners and braided hose, for springs and mechanisms, for racks and shelving that can live in any environment, for fool-proof, fail-proof controls and rigging, for incredible strength in the smallest diameters. **FORGINGS**—rough billet stock, finished or semi-finished custom components, shaped to your specific requirements. For strength, hardness, and endurance where nothing less than the finest can be tolerated . . . Allegheny Stainless. **BARS**—the ultimate in machinability and chemistry balance for any application. Superbly finished, perfectly sized, and ready for shaping to your needs, stainless bars are among the finest products of the Allegheny mills. **PLATE**—for problems of big volumes and high pressures . . . for the corrosion, oxidation, and contamination so common to chemical processing . . . the massive workhorse of the stainless line. Solid stainless or clad stainless . . . the finest you can buy is Allegheny Stainless.

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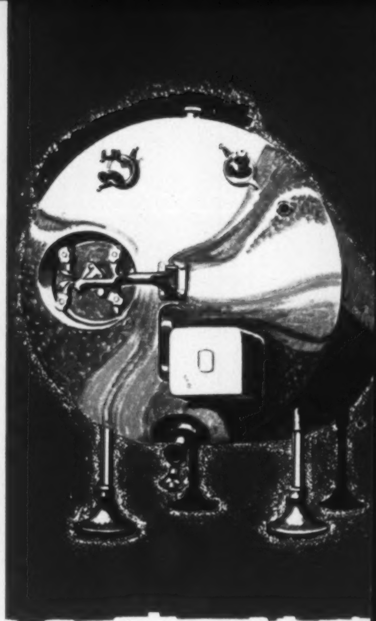
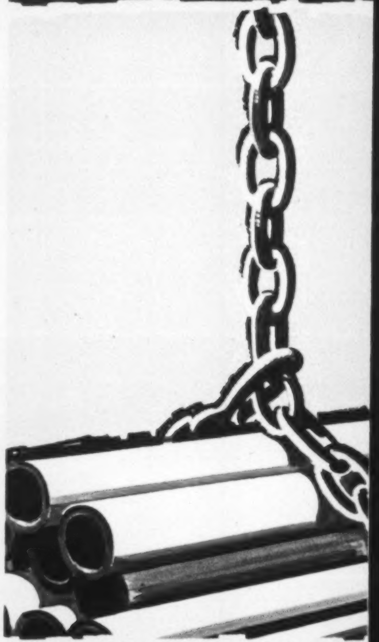
ALLEGHENY LUDLUM





MARKET-PLANNING DIGEST

Metalworking Newsfront 6

"ORDERLY" BUILDUPS OF STEEL STOCKS are being attempted. But the attempt may not be successful. Stocks are too low and customers are starting too late to build them up. The frenzied buying of the past may well come in the early part of the second quarter of next year. General business is picking up strongly yet incoming steel orders are not much above consumption.

MORE COMPANIES ARE BUYING COMPUTERS today for inventory control than for any other single purpose. This desire for closer stock control suggests future swings in inventory buildup and cutback could be less violent. Evidence shows these swings occur more quickly but may not run as high or low before correction.

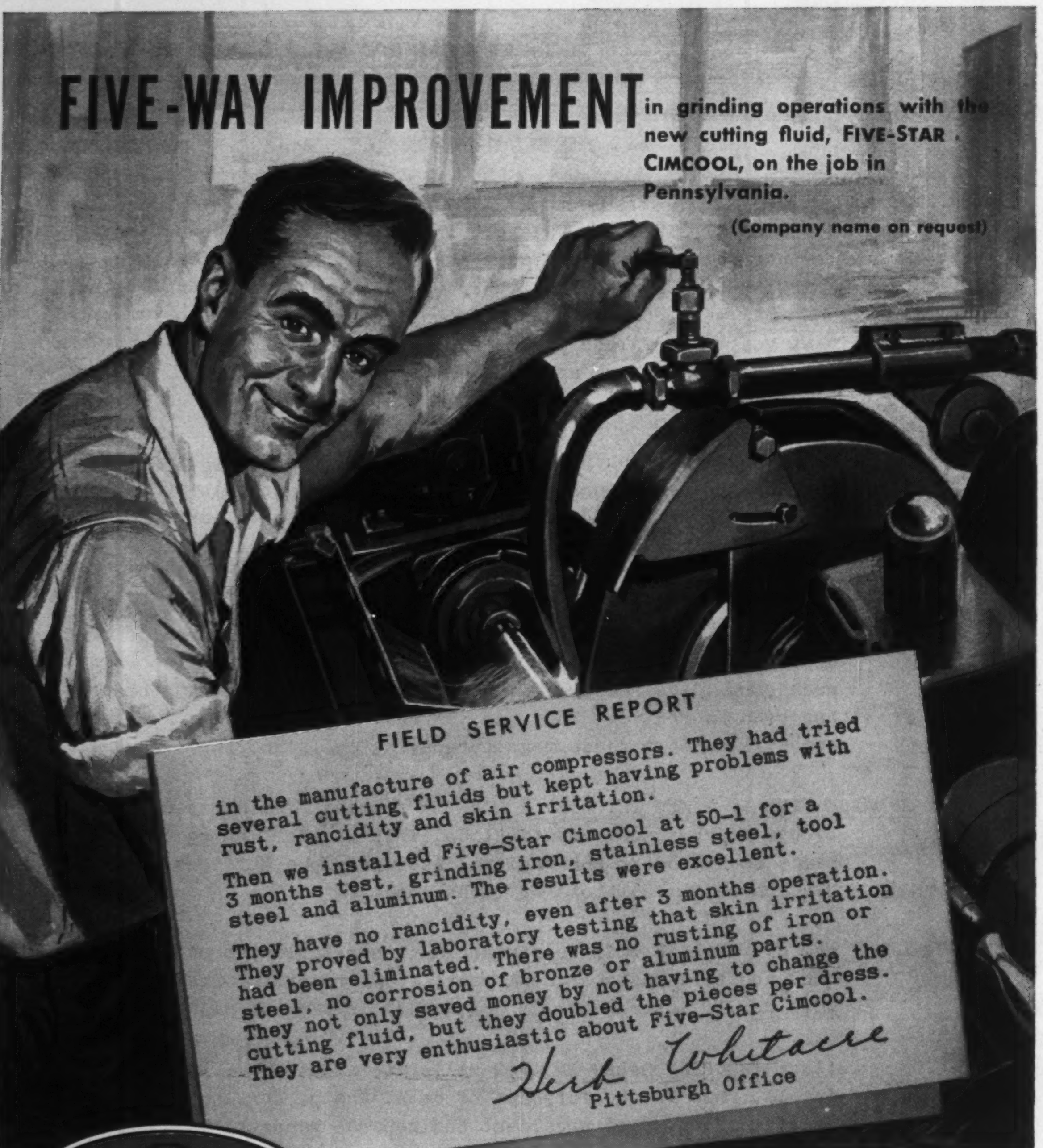
A MAJOR SURGE IN RAIL CAR BUYING is forecast by car marketing men for the first half 1962. Despite the major block of new rail car orders released to builders by railroads in the past two weeks, builders are unwilling to concede the real breakthrough has been scored yet. They say the real test will come in December when most roads make car-buying decisions for the year.

THE AVERAGE TIME IT TAKES TO BUILD A HOME is reduced from 81 to 58 days by use of component construction. This is the finding of a study sponsored by the National Assn. of Home Builders and the Massachusetts Institute of Technology.

NEW LIGHT WEIGHT TINPLATE will be commercially available for motor oil cans about February of next year, it is reported. The tinning will be .10 instead of .25 coating as in present plate.

MAJOR APPLIANCE INDUSTRY SALES IN 1962 will rise about 5 pct above 1961 totals. This is the forecast of J. W. Craig, Westinghouse Electric Corp. vice president and general manager, Major Appliance Div. He points out this would be the first time in six years the industry will show sales improvement for two years in succession.

MILLIONS OF DOLLARS ARE WASTED BY MARKETING executives because they cannot or will not learn to use scientific methods for solving present day marketing problems. This is the view of motivation researcher, Louis Cheskin. He says controlled MR shows consumers' wants and buying habits have changed "drastically." More controlled MR is needed, he claims.



FIVE-WAY IMPROVEMENT

in grinding operations with the new cutting fluid, FIVE-STAR CIMCOOL, on the job in Pennsylvania.

(Company name on request)

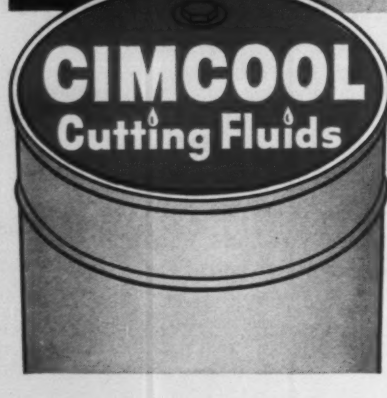
FIELD SERVICE REPORT

in the manufacture of air compressors. They had tried several cutting fluids but kept having problems with rust, rancidity and skin irritation.

Then we installed Five-Star Cimcool at 50-1 for a 3 months test, grinding iron, stainless steel, tool steel and aluminum. The results were excellent.

They have no rancidity, even after 3 months operation. They proved by laboratory testing that skin irritation had been eliminated. There was no rusting of iron or steel, no corrosion of bronze or aluminum parts. They not only saved money by not having to change the cutting fluid, but they doubled the pieces per dress. They are very enthusiastic about Five-Star Cimcool.

Herb Whitacre
Pittsburgh Office



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For full information on the complete family of Cimcool Cutting Fluids, call your Cimcool Distributor. Or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

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Can Steelworkers' New Counsel Replace Arthur J. Goldberg?

Arthur J. Goldberg's former law associates have succeeded him as counsel for the Steelworkers.

Although relatively unknown outside USWA circles, the new firm of Bredhoff, Feller & Anker is experienced and qualified.

By Tom Campbell

▪ What will Dave do without his "brain"?

The "Dave" here is David J. McDonald, president of the United Steelworkers of America. The "brain" is Arthur J. Goldberg, who, before becoming Secretary of Labor, held down the position as counsel to the union, its bargainer, and Dave's close friend.

The question is being asked by people in management, in labor, and by the press. And some of Dave's own union people may also be asking the question.

Mr. Goldberg never did like the tag "McDonald's brain." He felt that it demeaned Mr. McDonald. Nor did Dave care too much for the label because he probably felt those who used it were downgrading him. On the whole, both were wrong. And the tag stuck because Mr. Goldberg often looks, acts, and talks like a "brain."

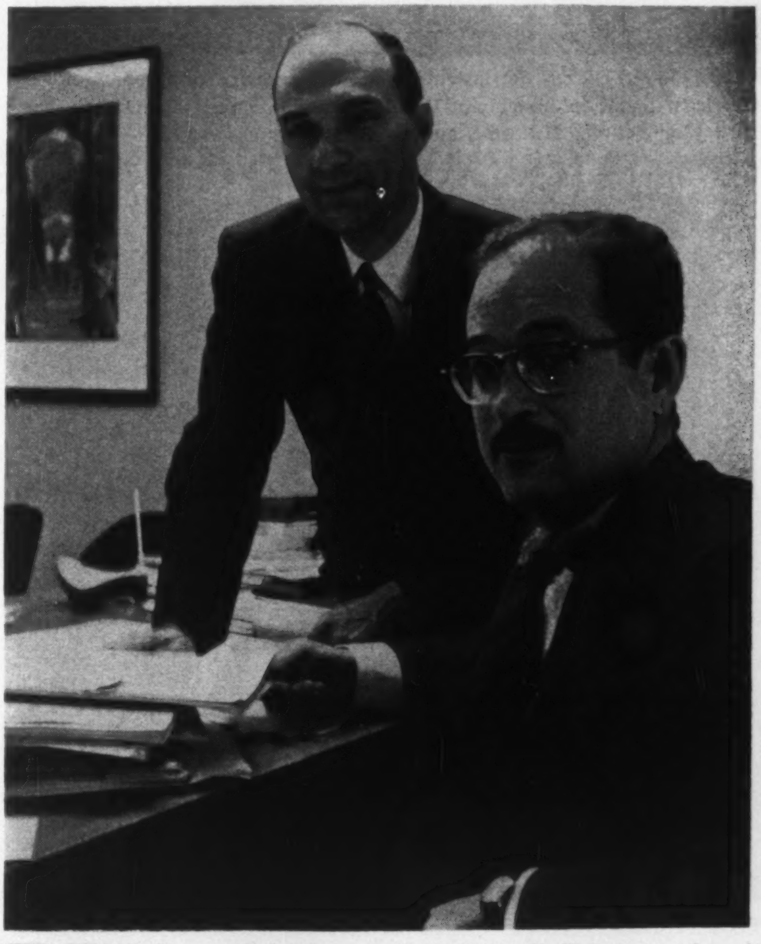
Changing Clients—So, on to the question. What will happen now that Mr. Goldberg will not have Dave and his union as his clients? It is well-known to those who are close to Labor Secretary Goldberg that he has two clients—The United States and President John F. Kennedy, or vice versa.

A lawyer cannot possibly serve two clients who are on opposite sides as the union and the government may be. And, besides, Mr. Goldberg has severed all relations now and hereafter with the USWA, and with his former law firm.

Into the breach come two young men who took over for the firm of Goldberg, Bredhoff and Anker. They have added a younger man, Jerry D. Anker, to form: Bredhoff, Feller and Anker.

Ready for Cooper — Elliot Bredhoff was described here some time ago as an introvert. David E. Feller, his partner, was called the extrovert. Each took exceptions to those tags, on a technical basis.

Bredhoff and Feller have been



NEW TEAM: Former Goldberg associates, David E. Feller, seated, and Elliot Bredhoff, are new USWA counsel succeeding the Secretary of Labor.

LAST TIME: During the last negotiations, Secretary of Labor Goldberg won legal praise, although not the decision, in arguing against the Taft-Hartley injunction. This time, he may take a different view.

THIS TIME: In contrast to past labor negotiations, the Secretary of Labor has a new client, President Kennedy and the U. S. Regardless of former associations, he is not necessarily in the Steelworkers' corner.

through a lot of hassles together, and with each other. They are not newcomers to the steel labor field. Mr. Goldberg trained them in his way of looking at things. They are qualified to speak for themselves—and do.

Rumors from "outside" say that because they are younger, have had less experience with Mr. McDonald, Dave would not feel at home with them and that they would have a tough time. Maybe so. But not as bad a time as many think.

Lawyer friends of Bredhoff and Feller figure them out this way: Elliot Bredhoff is the more stable of the two while Dave Feller has the dynamic sparks of brilliance, which often explode without much advance warning.

Have Dave's Confidence—Again, maybe so. But the two men have already had their internal tilts and inside discussions within the union. They know where they stand. They will play their proper part with Mr. McDonald and his people. There appears no tell-tale sign that Dave will be too lonesome without Mr. Goldberg.

When the time comes that Dave's experience tells him he should be the Big Wheel, then he will be it. When the time comes for Bredhoff and Feller to move to the front, they will move there.

There are some who disagree with this slant on the new team or, maybe quite properly, will want to wait and see. But one thing is sure; Bredhoff and Feller will work better together as a unit. This way they are able to get almost 50 pct more than if they worked separately.

They complement each other; they do not supplement each other. That is what Mr. McDonald sees and that was what Arthur Goldberg saw. Maybe he planned it that way.

The part that Jerry Anker will play is the usual one for the younger member; check details, edit copy, do the legwork, and generally act like the low man on the totem pole—officially. But within the threesome, he ranks high with Bredhoff and Feller.

The team is ready for and expects

a hard time from the steel management negotiators. The men expect their relations with the USWA to be of the best. And, despite misgivings among some in the legal fraternity, they feel they will measure up to what Mr. McDonald expects.

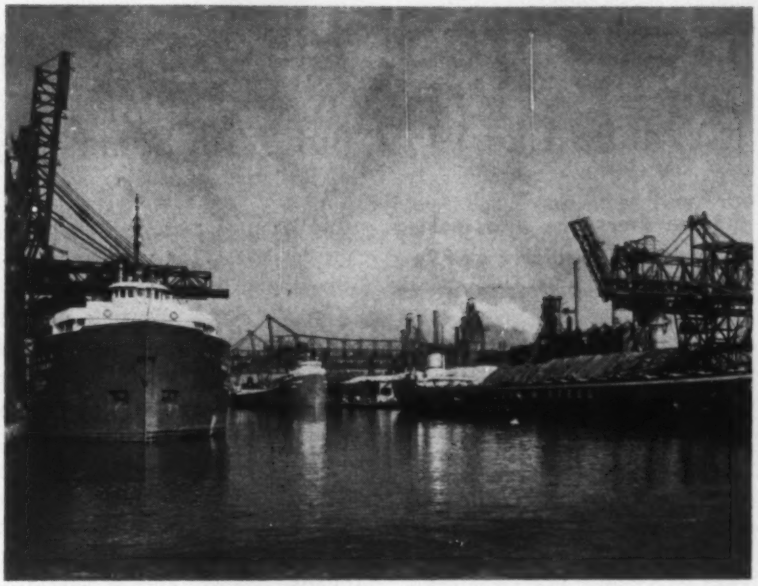
This is partly because of the work that has already been done by the law firm as counsel for the Steelworkers. Both sides are more than pleased with the results.

Goldberg's Role—But in the back of some minds is another question: Has Dave **really** lost his "brain"? The theory is: Because of Arthur Goldberg's long training, his beliefs, and his long association with the union, he will be in labor's corner as Secretary of Labor. A quick affirmative answer to that question would be given only by those who do not know the Secretary of Labor.

True, Mr. Goldberg will not forget his views, his training, or his basic convictions on labor. But, at the same time, Secretary Goldberg is not working for himself or a union. He is working for the United States and for President Kennedy. When the President and Secretary of Labor agree on something that should be done for the good of the nation, then he will hop to it and get it done precisely as he did in private practice—only this time he will have the power of the President behind him.

Thus, it is by no means certain at this time that President Kennedy and his Secretary of Labor are in labor's corner. Nor are they near management's corner by default. Just where they will be in relation to labor is the biggest question mark of next year's steel labor hassle.

The Windup—It will be up to Elliot Bredhoff, David Feller and David McDonald to find out where the White House and its chief labor advisor will be next July. That is where his sixth sense and playing it by ear will help Dave McDonald. In the past, he has often left the legal aspect of bargaining to others at the table, but he has crashed into the donnybrooks at the "time" his past experience has told him to.



Slow Ore Year Ends on Uptrend

▪ Great Lakes iron ore shippers are finishing up their slowest nonstrike season since the 1958 recession. There's some consolation in that it's finishing on a mild upturn.

Lake Superior district shipments this year by water will come to about 57 million tons. As of Nov. 1, they had reached 51.4 million tons (U.S. and Canadian shipments combined). That is about 16 million tons behind the same period of 1960, according to statistics of The American Iron Ore Assn. and the American Iron and Steel Institute.

Lake Traffic—Boat operations started slowly this spring. In late summer they picked up as steel operations showed signs of a rally. Ore yards were already full, thus Lakes boats were only replacing inventory. This created a difficult scheduling operation in Great Lakes and adjacent yards.

Shipments this year will substantially trail behind last year's 69.6 million tons. Strike-crippled 1959's total was 46.8 million. Much of the deficit was made up in 1960.

This year will be the slowest (excluding 1959) since 1958 when shipments reached 52.8 million tons for the season. For a decade, they had been more than 74 million tons annually.

Nationally, imported ore (not including Canadian) took less than its portion of the market. In recent years imported ore has had one-third of the market.

Comparison Figures — Through the third quarter, imports were 11.8 million tons, principally from South America. That compares with 40.6 million tons brought in from the Lake Superior district mines and 11.5 million from other U. S. mines.

Consumption of iron ore, through the third quarter of this year, trailed 1960 by more than 13 million tons.

How Steel Users Plan Buildup

It Will Be Like 1959, But With Some Variations

Some users are also making long-range plans for cutting their inventories after the strike threat eases.

Others plan to wait until the 2d quarter before buying.

By K. W. Bennett

▪ How's your steel inventory? Many buyers warn that any talk of inventory buildup to cover a possible steel strike will trigger scare buying. Privately, most buyers are already covering themselves against just that.

There's not much talk. Among the major consumers, General Motors Corp., and American Motors Corp., preferred not to comment. Ford Motor Co., confined itself to a guarded, "We will probably reach peak inventory in May. And we are now in the process of building inventory. Because we produce our own steel, we believe that our inventory buildup would not equal that of other auto producers."

Buying Stops—But as steel mills look hard for November-December business, they've already had to put some buying stops on several steel grades for first quarter delivery. Galvanized sheet and hot-rolled bars were the first affected in several areas. Hot-rolled and cold-rolled sheet are becoming sensitive. Wide plate and terneplate went on the list last week. No steel man likes to use the word "quota," but that's what purchasing agents are calling their first quarter allotments.

How much of an inventory buildup? In a sample of more than 30 major steel users, inventory buildup planned for the first half of 1962 averages 25-50 pct. Some large users still have planned no increases. Some even larger users are talking of gains that run, in one auto industry case, to 300 pct of present levels. They will begin Jan. 1 and end, hopefully, June 1.

In the 1962 inventory buildup as now planned, there are at least four new trends:

Early Birds—1. Despite the low level of steel inventories generally, a small group of buyers has already made solid inventory gains. For example: One sheet user decided on a permanent 30-day floating reserve (above normal inventory levels) after the hectic steel buying race of second-quarter 1959.

With this as a reserve, he'll add another 15 pct in a gradual buildup that started in October and will end in June. Another buyer began purchasing against a price increase in September. He's still building at a steady 8 pct gain per month, will phase out in June.

2. There will be more emphasis on first quarter building this time than in 1959. One large auto maker, figuring on a strong buildup, will complete it by April. It will boost his inventory by 100 pct. "And maybe we'll add a little more if things look bad then," he says.

A major heavy equipment producer tentatively plans to boost inventories by 30 pct. He hopes to

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What Steel Buyers Plan

The following are exclusive comments that the IRON AGE received in response to questions about steel inventory buildup plans:

Whirlpool Corp., R. S. Rice, director of purchases for the laundry groups:

"We are considing the acquisition of an inventory to keep our product lines operating in the event of a steel work stoppage in mid-1962. Our present plans call for an accumulation at the rate of 20 pct each month to peak on May 30. Inventory liquidation will be conducted at a similar monthly rate following settlement of negotiations. Our target date for inventory liquidation at the termination of negotiations is Nov. 30."

J. M. Mead, Vice President, Procurement, Joseph T. Ryerson & Sons, Inc.:

"For all our warehouse products, except stainless and aluminum, we plan to purchase additional tonnage during the first quarter of 1962, to enable us to have on hand one extra month's worth of inventory on June 30, over and above normal stock levels."

Chicago Bridge & Iron Co., R. E. Hallenbeck, General Purchasing Agent:

"We still haven't made a decision on inventory. But if we were to move, and note I say if, I'm pretty sure it would begin in first quarter and spread out all the way to June 30. We're carrying a moderate inventory now, and a buildup would follow a historical model. I don't see more than a 20-25 pct increase if, and again I emphasize the if we do increase."

William A. Ehresman, director of purchasing policy and supplier relations, The Budd Co., major supplier of auto frames, stampings, and assemblies:

"Our company buys more than

finish the job by April. He's starting with his January orders, some of which are already placed.

Insurance Orders—3. There are plans now for a flurry of insurance orders to be placed in June. After the last strike, most mills gave top-strike priority to orders placed on their books just before the strike. Some buyers had already cut back, believing their inventories high enough. After the strike, they had to wait while pre-strike orders were run, or buy on allotments based on their lower pre-strike order sizes. They don't want this to happen again.

4. There's still a strong segment of steel users who haven't boosted inventory and aren't planning to until the second quarter. Generally, they are smaller companies or job shops. They point out that profits are low, cash tight, and they'd better keep cash in hand. Even in major corporations the decision to tie money in inventory has had to go all the way to the chairman of the board. The point: In a majority of cases queried, the go-ahead has been given.

Many companies are still at rock-bottom on steel inventory. Their steel buyers are warning them to expect steel delivery times, particularly in sheet, to at least double the present 3-4 week figure by February. Some steel men privately express worry that some mills will require 10-12 weeks on flat-rolled products. To a user who has a 30-day steel inventory, a 30-day extension in lead time is a steel shortage. He must manufacture on minimum inventory and lead time. And that costs money.

Price Problem — Another factor troubling buyers: Most do not expect a steel price increase. But some still feel a first quarter price increase is possible. Part of their buildup is planned with that possibility in mind.

Finally, inventory planning is much longer range than it has been in past years. Some far-sighted buyers not only are planning how they'll build inventory, but how they'll cut back later.

An International Harvester Co. spokesman summed it up, "We'll build to an additional 60 day requirement above normal levels (a 100 pct gain). Deliveries are scheduled to rate the buildup at 20 pct per month."

Runs Gamut—The buildup runs the gamut—from steel service centers to manufacturers of electronic products, materials handling equipment, packaging, air conditioning, appliance, earth moving equipment, automotive and farm equipment.

Nobody wants scare buying. But the buildup is swinging into gear.

500,000 tons of steel each year, almost all for auto industry products. We expect to hear soon from customers on what they want us to do in the way of a strike-hedge buildup. During the 1959 steel strike, we went into the period of mill shutdowns with a three to four month supply of steel.

But increases in auto output, upset our stockpiling plans a little. Before the '59 strike some of our auto accounts gave us a definite production figure, say 50,000 units, to turn out after July 1. They asked that we stock enough steel to meet this schedule. Other accounts told us to put in enough steel for about three months of operation.

Normally we maintain a four-wall inventory averaging about 125 pct of our expected month needs for each steel product. In some cases, the percentages are higher."

F. J. Robbins, Bliss & Laughlin, Inc.:

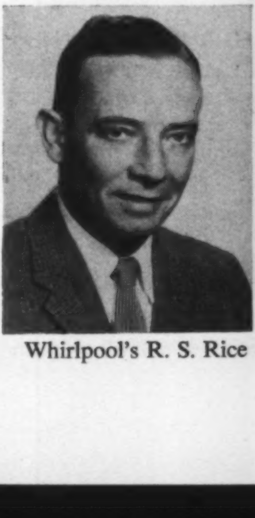
"We are already building inventory, not as a strike hedge, but to offset gaining volume in our own business. We expect our inventory buildup to peak in March-April, and as a rough percentage, we believe it will reach no more than 20-25 pct of current stocks. We will accumulate 10 pct per month to January 15, and 5 pct a month to April."

William O. Graham, Director of Purchases, General American Transportation Corp.:

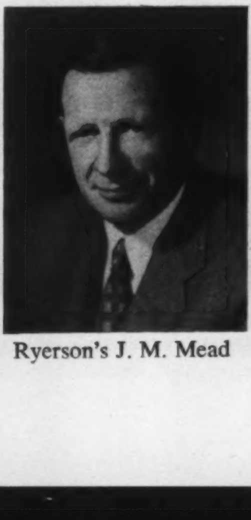
"The current set of conditions governing our purchasing can be summarized as somewhat normal. Inventory positions are always watched closely at General American Transportation Corp., and we are not taking unusual measures of any kind now."

A. F. Tydeman, Director of Purchases, Kropp Forge Co.:

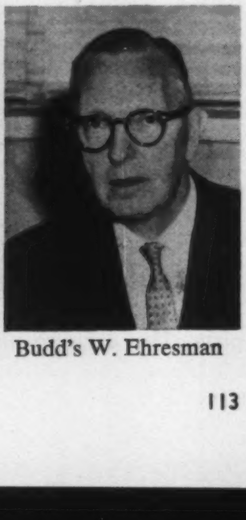
"We've begun no inventory accumulation, and don't intend to do so except against customer orders. But there's been a slight indication that customers are already stocking forgings. In the past, this usually didn't happen until mid-January and then peaked in mid-March. We're going ahead on the assumption there will be no strike. . . ."



Whirlpool's R. S. Rice



Ryerson's J. M. Mead



Budd's W. Ehresman

Aluminum Eyes Heavy Industry

Producers Begin Drive for New Markets in '62

Uncle Sam sparks the push by specifying more aluminum in military weapons and vehicles.

Metal is also being used more in commercial trucks, railroad freight cars, electric towers.

By K. W. Bennett

▪ Aluminum has invaded the heavy industries and 1962 may be the year of the major push.

At least one aluminum producer hit 90 pct of capacity recently. The industry has set its sights on new markets where load-bearing strength is critical.

Sparking the push will be the Defense Dept.'s heavy use of aluminum in military equipment. The purchase of 1500 personnel carriers was a start. Each carrier uses four tons of aluminum armor. In addition, Cadillac Div., General Motors Corp., is building 105 mm self-propelled howitzers that employ 6 tons of aluminum armor each. There are other vehicles that use as much as 10 tons.

250,000 Tons — Estimates that military use will go from 200,000 to 250,000 tons during 1962 are considered conservative by some.

Aluminum producers are also moving into the field of electric power transmission towers. The towers are getting heavier, as utilities switch to heavier line loads. Kaiser Aluminum has an order from American Electric Power Service Corp. for 700 towers that will use 1500 tons of aluminum. Reynolds says "several dozen" utilities are buying aluminum towers.

ROLL OUT: Aluminum-covered hopper cars roll out of an ACF Industries plant. They can carry a variety of materials without contamination.

Another growing aluminum market is truck production. At least one truck builder put out 50 over-the-highway trucks using aluminum in the load-bearing areas. This year he's working on orders for 150 units.

Other Trucks—Aluminum Co. of America reports at least four dump body builders have turned out heavy, over-the-highway dump truck bodies. International Harvester, for example, on one of its heaviest trucks, has aluminum wheels, brake shoes, hubs, axle housings and transmission housings. Autocar Co. builds an entire tractor cab of aluminum with a total weight of 580 lbs. Both Heil Co. and Fruehauf Trailer Co. are building over-the-highway tank trucks with a full aluminum tank.

Aluminum Co. of Canada, Ltd., built at least five aluminum truck bodies for Canadian Johns-Manville. And Canadians are predicting an annual 25,000-ton world market in the near future for dump bodies alone.

There are at least 1500 aluminum railroad freight cars in service or on order, with Southern Railways and Southern Pacific Railroad Co. the biggest users. Estimates on rail use of aluminum vary widely, from Reynolds' widely-reported 10,000 tons in 1960, to Kaiser's admittedly "low side" figure of 5200 tons next year. An explosion in rail car ordering, such as occurred in 1958, would force forecasts up sharply. A 1000 car per year rate by 1965 is the current goal.

Storage Tank — Aluminum has eyed the large field storage tank for some time and is moving in with gaining strength. It has proved excellent in handling cryogenic liquids, even liquid hydrogen at 423°F. The liquid gas market is expanding rapidly, though tank size is considerably smaller than the field storage type. Oxygen, methane, and nitrogen are other liquefied gases that have been housed in aluminum in growing quantity. And hydrogen is the top candidate for future high thrust rocket fuels which would use it in great quantity. Reynolds points out that powdered aluminum as a rocket fuel additive could reach a consumption level of 17,000 tons annually by 1965.

In big tanks and pressure vessels, Reynolds expects to hit 3500 tons of plate per year by the end of three years. This is tapered plate, a new product, which sold 250 tons in its first six months.

Aluminum is also after drill pipe business. Aluminum drill pipe is already marketed, though drilling experience is still limited to specific types of rock formations. The test well using this pipe has been put down to 100,000 ft. Extensive marketing will begin when the test hole has been driven to 200,000 ft.

Big Year—Aluminum is out to penetrate the heavy industries. And 1962 may be the year for aluminum to set a new record, because of its success already in these markets.

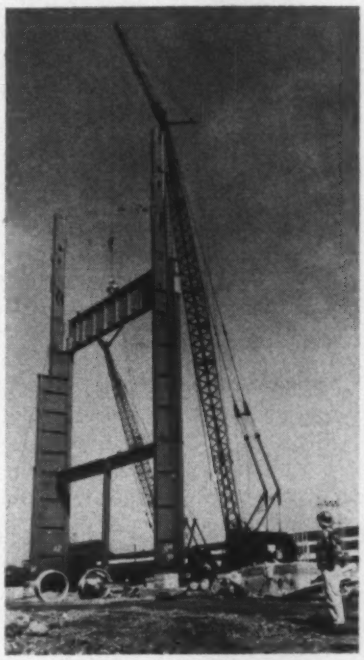
Defense has been a big customer in the past. But aluminum's sales success depended heavily on missiles and aircraft expenditures. With major gains in the ordnance-automotive field, it appears aluminum can take a dip in aircraft business.

Aluminum's number one customer was the building market, but only as a covering material. Now, it's entering the structure.

More Uses—Other examples of aluminum's increased emphasis on heavy industry markets include: Aluminum barges for heavy bulk materials, a trickle of aluminum frame homes, and installation of new extrusion presses of unprecedented size.

In tonnage, aluminum is still small compared with steel. In the heavy industry market, it looks even smaller. But it is penetrating an area where steel men had often claimed profits were already too low.

Stora-Kaldo First



BUILDING SUPPORT: Cranes place the first pair of more than 100 structural steel columns to support main building for the first Stora-Kaldo oxygen steelmaking plant in the U. S. It is being built by Dravo Corp., Pittsburgh, for Sharon Steel Corp. at Farrell, Pa. Furnaces will have capacity of one million ingot tons.

Tax Credit Plan Still Irks Some

Despite growing business support for President Kennedy's tax credit plan (IA, Nov. 23, p. 51), there is still much industry dissent. Industry representatives in Washington continue to work against it.

Many companies, particularly those with already expanded production facilities, feel the investment credit plan would leave them out in the cold. (The National Association of Manufacturers backs up their claim. NAM says the plan would favor currently expanding firms at the expense of companies which have already done a good job of modernization.)

The credit plan, equal to eight pct of a company's investment in new equipment in a year, was almost unanimously opposed by industry last year. Businessmen testified at Washington hearings that they wanted depreciation reform instead. Development of a speed-up in depreciation allowances by the Administration changed some minds.

But other firms are still not convinced. They can see where they could be left out of both the tax credit and the depreciation change.

Republic Appoints New Sales Chief

S. A. Crabtree, general sales manager of Republic Steel Corp., has been named vice president in charge of sales. He will replace Norman W. Foy, who is retiring.

Imported Steel Ban Attacked at Miami

N. A. Stitt, director of the U. S.-Japan Trade Council, has attacked the ban on foreign steel in building Greater Miami's International Seaport. He also represents the Japanese Iron & Steel Exporters Assn. and the Iron & Steel Materials Div., Japanese Chamber of Commerce.

In a statement to the board of commissioners, Dade County, Fla., Mr. Stitt noted that goods moving in and out of the U. S. through Florida ports have totaled $700 million in recent years.

"The commissioners of Dade County are not extending a friendly hand when they prohibit use of Japanese steel products in constructing a port intended to attract trade with Japan," said Mr. Stitt.

Aluminum Engines Grow

Aluminum engines took 10.3 pct of U. S. car engine production in the 1961 model year.

At the end of October, 1961, total aluminum engine production in the U. S. was 914,000. The first one was in 1959 in the Corvair, which has accounted for about two thirds of the industry's aluminum engine volume. The 1 millionth is expected late in November.

In the 1962 model year through October, aluminum engine installation topped 105,000.

INDUSTRIAL BRIEFS

Nonferrous Competition—$1,000 is the top prize in the third annual competition for the "Nonferrous Metal Powder Part of the Year." It begins Dec. 1, with parts made from any copper-base powder eligible in the contest sponsored by the New Jersey Zinc Co. Entry blanks can be obtained from the company at 160 Front St., N. Y., N. Y.

Philadelphia Warehouse — Alloy Tube Div., of the Carpenter Steel Co., has opened a Philadelphia branch warehouse at Fort Washington Industrial Park.

Acquires Lajo—Standard Beryllium Corp., has acquired Lajo Mines Ltd., a producer and concentrator of silver, with lead and zinc as byproducts.

Steel Boxcars — Searboard Air-Line Railroad has ordered 500, 70-ton steel boxcars from the Pullman-Standard Div. of the Pullman Co. The $7.6 million order is part of a 1,100 car order worth $14 million.

Hopper Cars—Thrall Car Mfg. Co., Chicago Heights, Ill., will build 10 covered hopper cars of a new lightweight stainless steel for Western Pacific Railroad.

Anaconda Buy — Anaconda American Brass Co. has acquired Metal Hoses, Inc., a Los Angeles manufacturer of metal hose assemblies and related products.

New Mine — American Smelting and Refining Co. has brought a major open pit copper mine into production. It is located near Tucson, Ariz., and has been under development for about two years.

Wire Mill—Riverside-Alloy Metal Div. of H. K. Porter Co., Inc., will erect a new building to house the Prentiss Wire Mills. The mills new home will be in an industrial park in Holyoke, Mass.

Contest Winners — The Steel Founders' Society of America announced the winners of the Centennial Product Development Contest. The contest had five categories: End cost; mechanical design; metallurgical design; redesign or conversion, and unusual, unique.

Station Purchase—Brubaker Tool Corp. has bought the property and buildings of the Pennsylvania Railroad Station in Millersburg, Pa. The purchase is part of a five-year expansion program.

Grayway Expansion — Grayway Precision, Inc., manufacturer of custom metal fabrications and machined components erected a new building in Paramus, N. J.

Metallurgical Society—The Metallurgical Society of AIME has elected Dr. K. L. Fetters of Youngstown, O., as its new president.

Aluminum Manufacturing—Kawneer Co. is constructing a plant near Atlanta, Ga., to produce aluminum walls, windows, entrances and sliding doors.

First Plane—Volaircraft, Inc., a new manufacturer in the aviation industry, has produced its first plane. The aircraft, "Volaire," is built primarily of aluminum.

FEMA President—C. D. Davenport of Century Engineering Corp., was elected president of the Farm Equipment Manufacturers Assn., at its annual convention.

Wide Plate — Phoenix Steel Corp's. Claymont, Del., plant will install a continuous wide plate heat treating facility. Drever Co. of Bethayres, Pa., is the supplier.

NEMA Award — A. D. Fraser, president of Alcoa's Rome Cable Div., received the James H. McGraw Manufacturers' Medal at the 35th annual meeting of the National Electrical Manufacturers' Assn.

Midwestern Expansion — Long-Lok Midwestern Corp. has been set up for the manufacture of self-locking bolts and screws in Cincinnati. The firm is a division of Long-Lok Corp., Los Angeles.

SME President—W. B. Stephenson, president of Allen-Sherman-Hoff Pump Co., has been elected president of the Society of Mining Engineers.

California Acquisition — Laminated Shim Co., Inc., Glenbrook, Conn., has acquired Lang Tool and Mfg. Co., Glendale, Calif. The Lang plant will continue to produce laminations.

Engineering Center — Piper Aircraft Corp. has opened a new Engineering Center at its Lock Haven, Pa., headquarters.

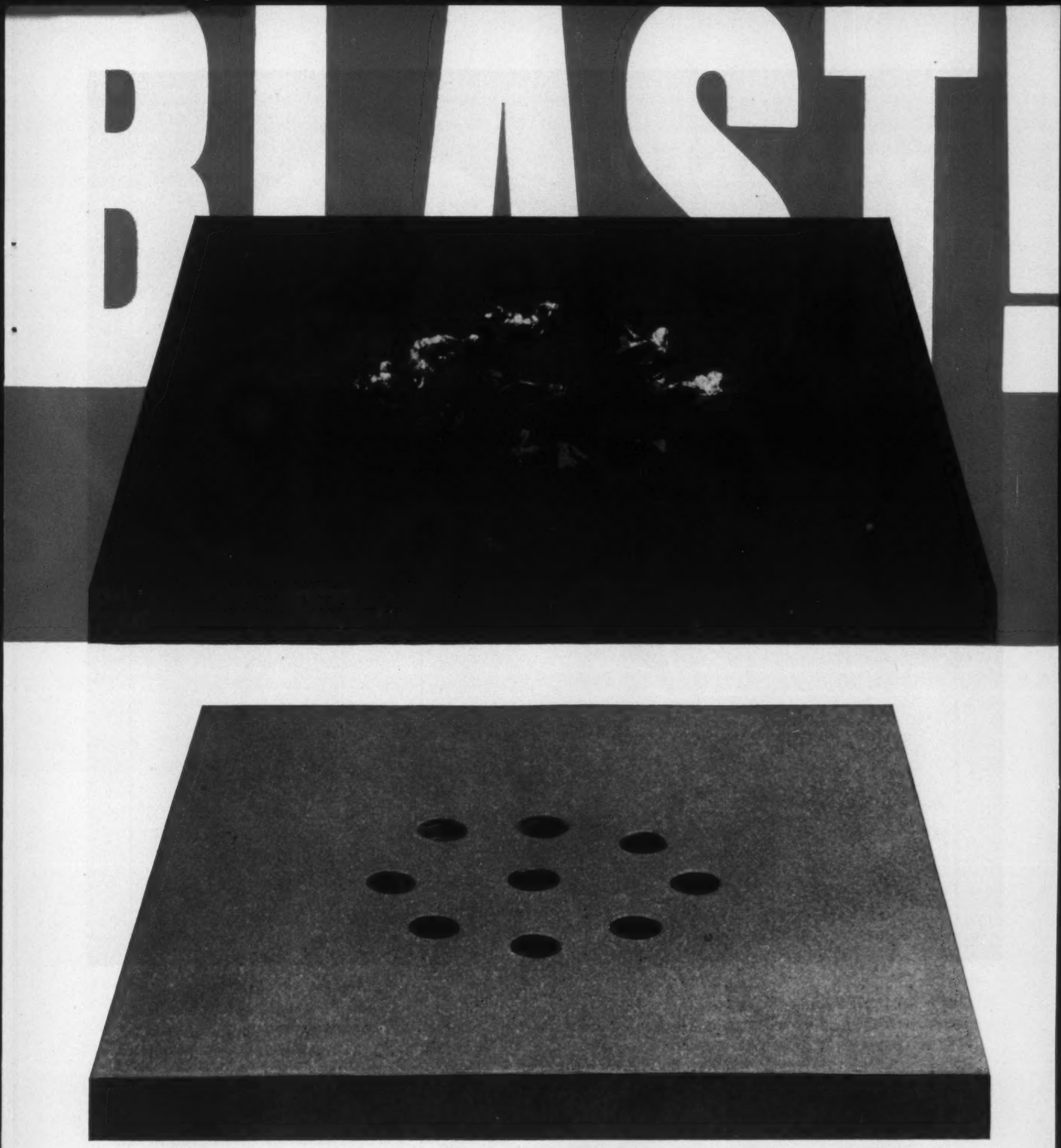
Rocket 'Brakes'—Thiokol Chemical Corp. has received a multimillion dollar contract for development and production of the main retro engine for the Surveyor lunar craft.

Calif. Office—High Temperature Materials, Inc., a producer of pyrolytic materials, has opened an office in Sunnyvale, Calif.

Facilities Completed—Rapids Machinery Co., Marion, Ia., has expanded its manufacturing and warehouse facilities.

Operations Combined—Glass-Tite Industries, Inc., and Saegertown Glassseals, Inc., have entered into an agreement to combine operations. If stockholders approve, Saegertown Glassseals will operate as a division of Glass-Tite.

Fiftieth Meeting—At the annual Fall meeting of the Metal Treating Institute in Detroit, L. F. Spencer, a metallurgical consultant from Huntsville, Ala., won the MTI Achievement Award. Elected officers were: J. H. Ries, Lakeside Steel Improvement Co., Inc., Cleveland, president; L. J. Haga, State Heat Treat, Inc., Grand Rapids, Mich., vice president, and M. Luntz, Wisconsin Steel Treating and Blasting Co., Milwaukee, treasurer.



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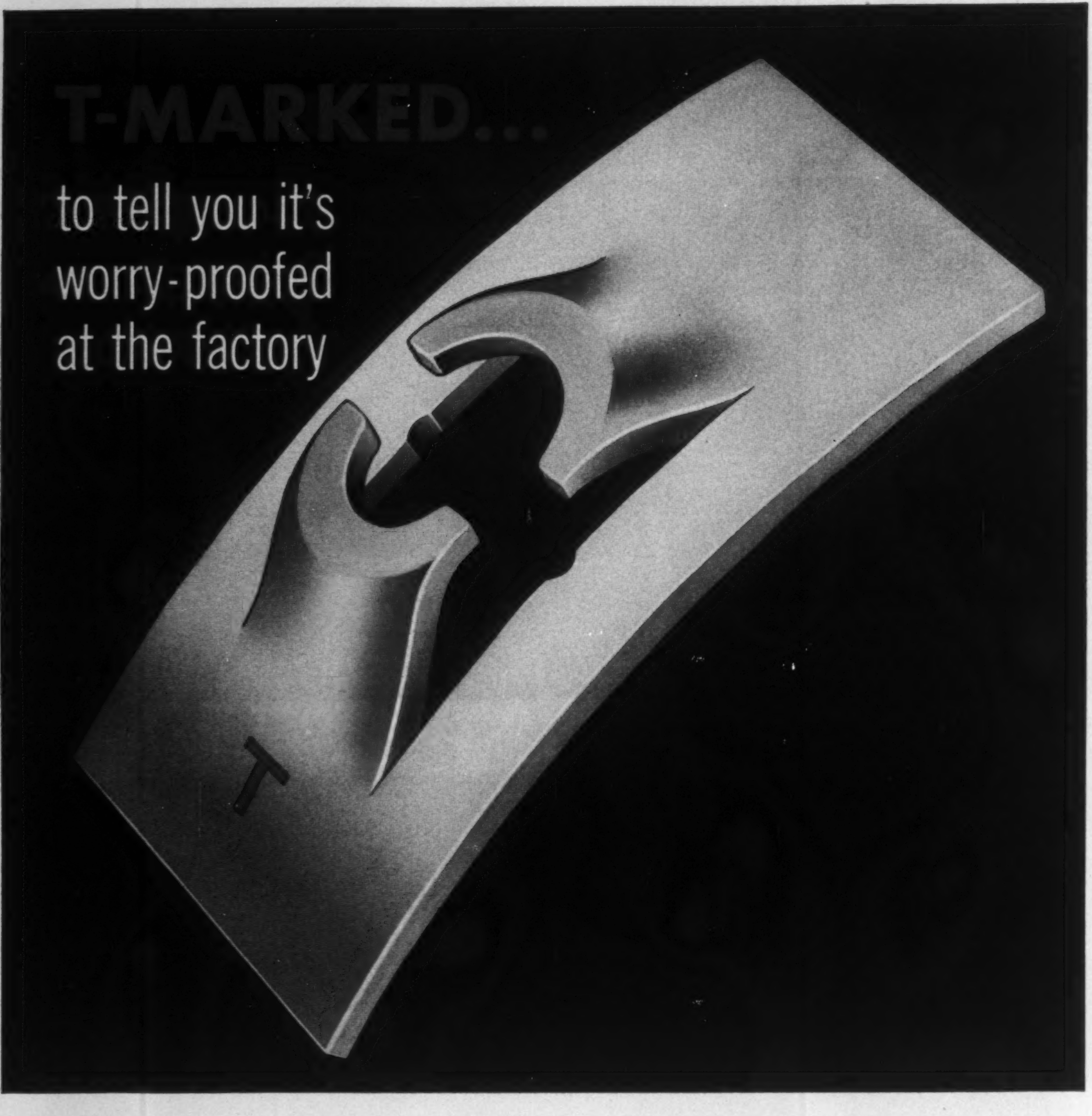
Electro Minerals Division, Niagara Falls, New York



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Get Full Benefit From Research

While industry spends millions on research, its impact on the economy is still not clearly understood.

Some of the areas for study: Better budgeting, more long-range spending, and accurate measures of efficiency.

▪ Many companies are banking on research to develop new products, uncover new markets, and bring about greater profits. But, despite this, the impact of research on the economy is little understood.

Its influence on a single company is not clear. In addition, very little is known about its influence at any economic level—for industries, for the nation, or internationally.

Measured Attack Needed—One expert, Dr. George James of the Battelle Memorial Institute, wants more study of research and its relation to the economy. In the Battelle Technical Review he notes, "There's strong need for a measured attack on the problems which relate research to its economic environment. Until now, too little effort has been devoted to this area.

"There's a strong tendency to invest in research as a degree of 'goodness' without understanding its economic impact. Research can and should be beneficial if properly understood, managed, and controlled. We should not continue to invest in it merely as a matter of fashion or as a defensive measure. The industry needs a science of the future—economics."

Dr. James doesn't supply any answers to the question. But he suggests a number of areas that might be investigated. In some cases these are eye-openers and, in all cases, they are worth thought.

Consider More Than Cost—For example, in discussing the company approach to research, he suggests better measures of efficiency. "Research operations might be better measured by the quantity of promising ideas and effective use of professional effort.

"In production operation, factors for direct versus indirect labor, or fixed versus variable costs, are generally developed. Attempts are often made to apply such factors to research operations, a common error.

"Actually a rise in research 'overhead costs' can be highly desirable. The rise may represent an increase in capacity of the professional research worker. If additional people and facilities improve the professional's ability to test an increased flow of ideas, then the additions are worthwhile."

Other Values—Beyond this, Dr. James suggests, research spending might be based on technical-economic forecasts which define needs and reveal opportunities, rather than on sales or competition. Companies could supplement long-range planning with forecasts on what research is needed to strengthen their position in future economic situations.

Avoid Day-to-Day Financing

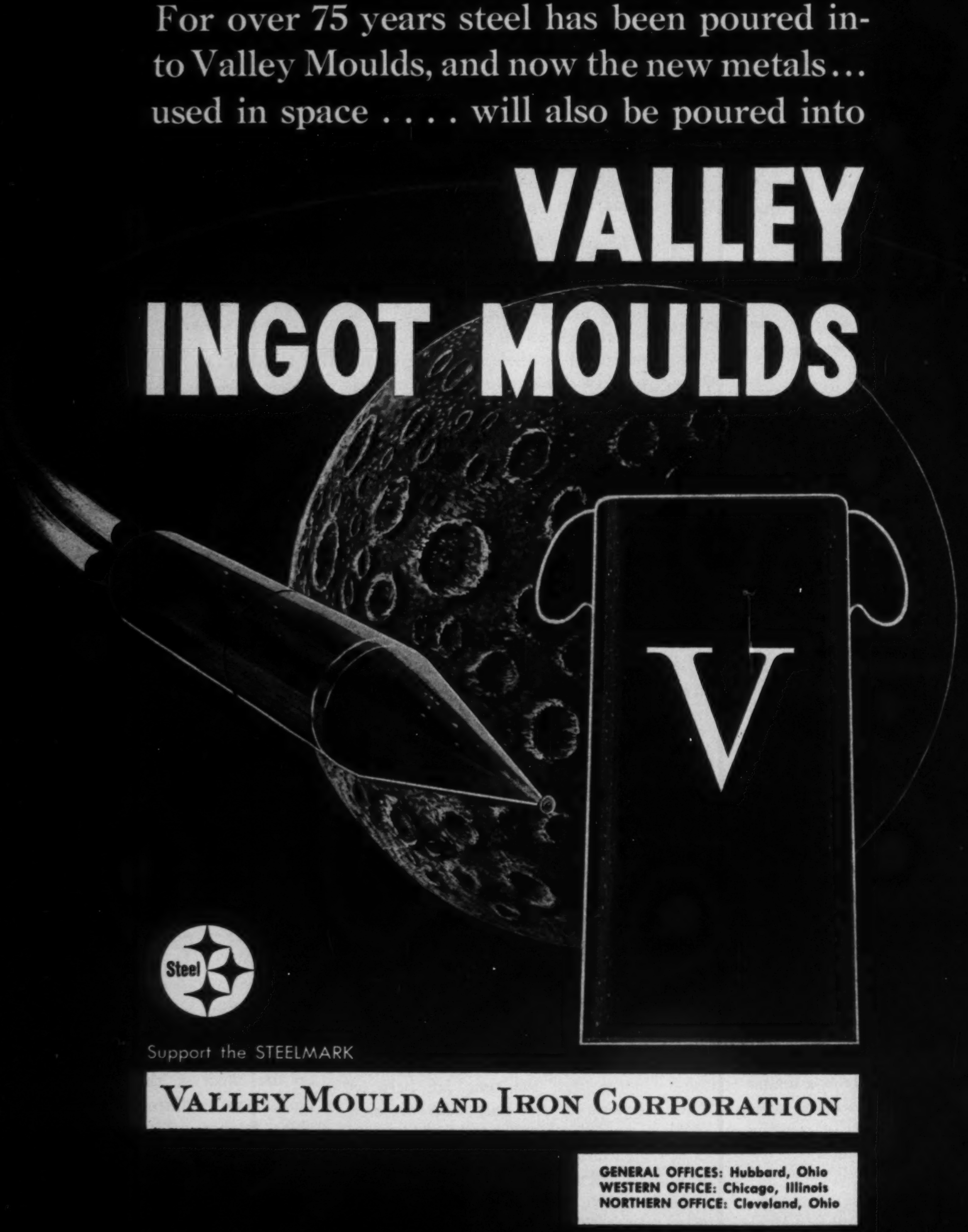
▪ Budgeting for research and timing the spending are difficult matters. They involve what Dr. James calls "time dimension."

"As an investment in the future," he says, "research cannot be financially managed day by day—as, for instance, the purchase of raw materials. Yet many companies attempt to do this. Such an attitude clashes with the inherent nature of research—distant time phasing for exploring what is not known."

Plan Ahead—Studies suggest, he notes, that the time lag between generating the cash and research spending is from three to five yearly quarters.

"Because of the nature of research, it should be planned well beyond one-year periods. If cash flow monies were earmarked to research activities for at least a year ahead (preferably more), directors of research and development could strengthen programs. Improved measures of financial control could then be developed from the longer planning."

Industry-Wide Approach—On an industry-wide level, the Battelle economist suggests a method might be developed so research spending could minimize business-cycle fluctuations. There might be studies on the effect of new products on the service industries. Also valuable: Analysis of the influence of research on the labor force, so labor transitions could be expected and made with minimum loss of productivity.



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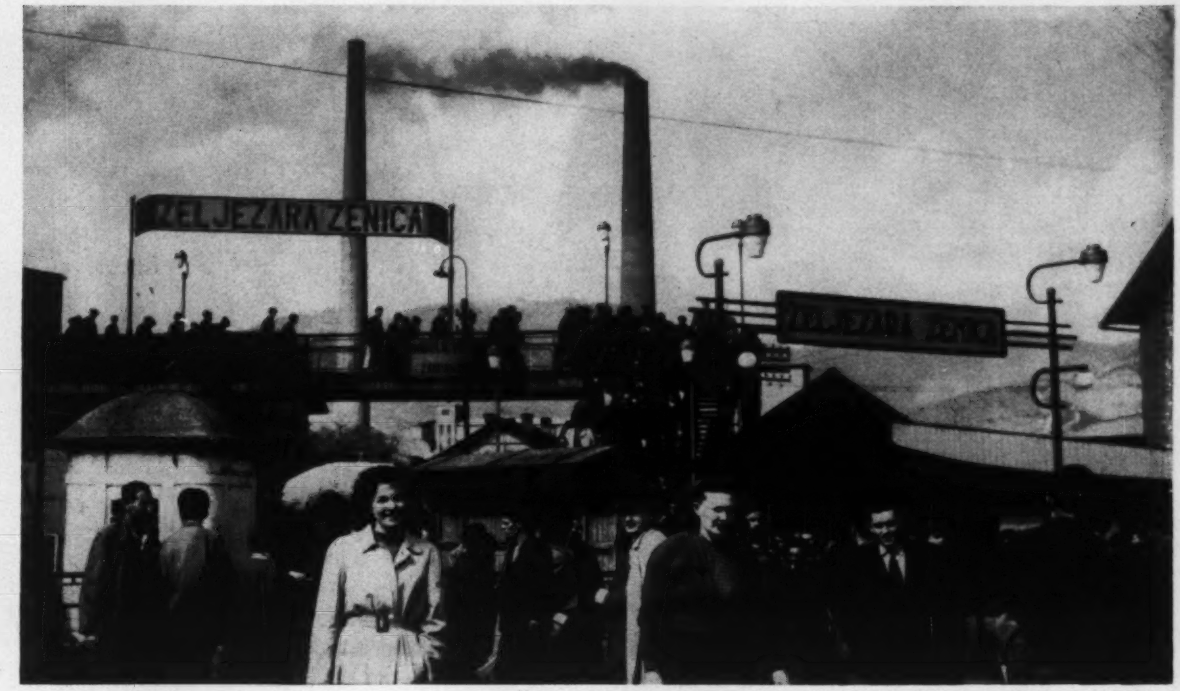


BIGGEST MILL: Zenica Iron and Steel Works produced about half of nation's 1.4 million metric tons in 1960.

Should West Trade With Tito?

Yugoslavia Is a Big Market, But There Are Problems

More than 70 pct of its foreign trade today is with non-Communist countries.

Many Western companies, including some in the U. S., see it as a growing market.

By S. D. Smoke

- Yugoslavia: A large and growing market opportunity. Many companies in the Western world have decided it is just that. These include companies in Great Britain, West Germany, Italy and even some in the U. S.

Today more than 70 pct of Yugoslavia's foreign trade is with non-Communist countries. The U. S. accounts for 10 to 15 pct of this trade.

Conventional foreign trade is the usual way that Western companies do business with Yugoslavia.

Reforms Made—Here are some results of foreign exchange and trade reforms made earlier this year:

A unitary rate of 750 dinars to $1 was set up. Multiple rates were ended and replaced with tariffs. Import controls were liberalized, with further liberalization scheduled.

There is no list of prohibited imports. But quantity limits on imports are applied to:

Import Limits—1. Motor vehicles, requiring import licenses.

Background for a Debate

This article was prepared at the request of the editors of the IRON AGE by Mr. Smoke, a former associate editor of this magazine, now a Washington consultant. His visit to Yugoslavia not only was cleared with various U. S. government agencies—it was made through their cooperation.

It is not an argument either for or against U. S. trade with Yugoslavia. This factual report about the country and its relations with the U. S. and other Western powers should, we believe, prove useful as background for the current debate on whether or not the United States should continue to trade with Yugoslavia.—The Editors.

GETTING ORIENTED: New recruits meet training director at Zenica mill. Major function of labor unions is to get workers off farms and into mills. Number of farmers has decreased despite the population increase.

2. Capital investment goods, which require verification of prior agreement for importation from the Yugoslav Investment Bank.

3. Component parts of goods assembled in Yugoslavia, for which similar verification is required.

In addition, importing of consumer goods is discouraged.

Export Limits—There are no export duties. However, quantity limits on exports, based on domestic needs and availabilities, currently consist of licensing requirements for some commodities and quota limitations on others.

Another method of doing business with Yugoslavia is product and technology licensing. England, France and Germany are already deeply involved in such arrangements.

Licensing is on the increase because it is commercially beneficial: (1) Yugoslavia, in the long run, ends up with a productive industrial facility; (2) a foreign company establishes a market for its products in this country where new and imaginative marketing ideas can reap profits.

Here, for example, is how a licensing arrangement works and how those involved benefit:

Car License—Fiat has signed an agreement with Cervena Zastava in Karlovac near Zagreb by which the Yugoslav company will produce Fiat 600's under license. Fiat supplies all technical documentation and specifications. At the outset, Fiat also supplies parts for assembly of the cars in Karlovac.

To get this enterprise underway, CZ got the money necessary to build its plant from the Yugoslav Investment Bank and went into business.

At present, CZ buys all of the parts for assembly from Fiat. Gradually, it will manufacture certain parts itself. Eventually, it will develop an automobile production and assembly plant and will be able to produce all of the parts needed.

Long Way Off—Production of all parts and the assembly of an entire car by a Yugoslav company is, however, some years away. Meanwhile, Fiat has a ready-made market. In addition, it gets paid for the management and technical services it supplies in the price it charges for its parts.

What happens when Yugoslavia can produce all of the parts and make the cars itself?

Why worry about that now, the Yugoslav economist will tell you. First, the foreign company has a ready-made market. Second, royalties can be paid for use of trade names. Finally, he argues, Yugoslavia is a growing country. And it is hard to imagine that the working relationships established through such licensing and royalty arrangements will not lead to other ways of doing business from which both parties can profit.

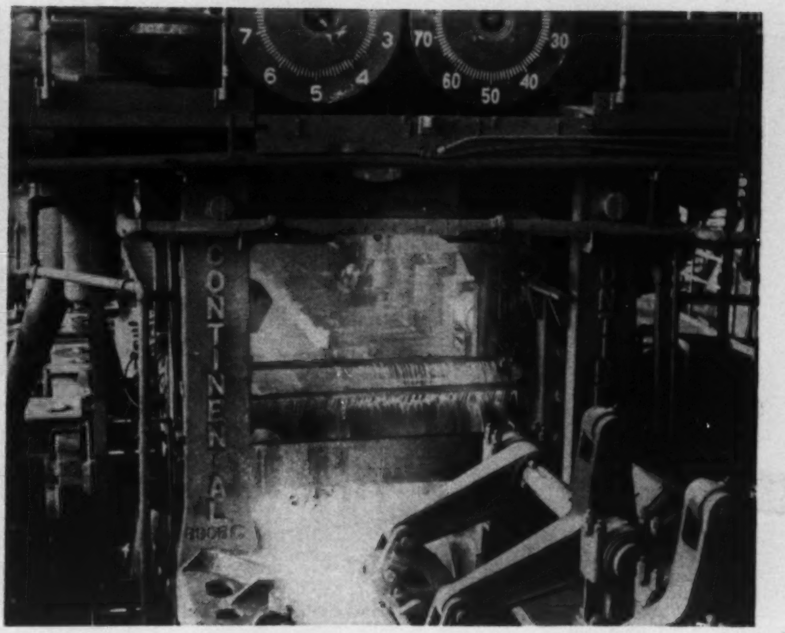
Other Agreements—Other similar licensing agreements already in

NEXT WEEK

Capital, Growth In Yugoslavia

Yugoslavia's financial structure and its economic plans for the future will be analyzed in next week's Report on Yugoslavia.

THE BOSS: He shares responsibility with the board of management.



AMERICAN MADE: U. S.-built 36 in. blooming mill, installed a few years ago as part of 750,000 tons-a-year expansion, is Zenica's production heart.

effect include:

Rade Koncar, electrical equipment manufacturer in Zagreb, and Siemens of West Germany.

Tomas, automotive manufacturer in Koper, and Citroen of France.

ITM, tractor manufacturer in Belgrade, and Massey Ferguson of Great Britain.

Litostroy, electrical equipment manufacturer in Ljubljana, and AEG of West Germany.

Leasing Plan — Still another—and not yet established—means of doing business in Yugoslavia is leasing.

Yugoslavia's current five-year plan calls for a doubling of steelmaking capacity by 1965—to 2.2 million tons a year. The 1970 goal is 3.5 million tons per year.

Achievement of this goal will depend greatly on construction of a steel mill in Skopje, capital of the Republic of Macedonia, with a capacity of 1 million tons a year. According to George Andrejevic, Secretary General of the Yugoslavian Iron and Steel Institute, construction will cost about $300 per ton or $300 million.

Foreign Lease—Yugoslavia does not have the money to construct this mill. And short term loans proposed thus far are too costly to finance a project of this size.

One competent observer on the scene suggests that a whole new approach to financing this project might be considered—construction by a foreign group on a long term credit arrangement. Common amortization for a mill of this kind is 30 years. Repayment, plus interest, and payment for all managerial and technical skills provided in the mill's building, shakedown and initial operation could be realized.

The foreign enterprise would thus be leasing the mill to the Yugoslav enterprise, just as a house can be rented with the rent plus interest being applied annually against the sale price.

Manpower Skills — Perhaps the most important product that can be sold in Yugoslavia is the management and technical skills with which the countries of the Western World are more amply supplied. Yugoslavia already purchases some of these skills directly. It receives additional services of this kind in the form of foreign aid.

Engineering schools have now been established in all of the universities in the capital cities of the six republics. Some enterprises also have established shop, vocational and technical schools right on their own grounds, and in the communes in which they are located. But Yugoslavia still needs more skilled management and technical manpower.

Still another way of doing business with Yugoslavia is cooperation in joint ventures in which Yugoslavia is now involved. This is especially true in the underdeveloped countries with whom Yugoslavia is likely to be increasingly involved in years to come.

Can't Exploit—Yugoslavia has a number of contracts for the construction of industrial facilities in these countries. But at present, she cannot fully exploit their potential.

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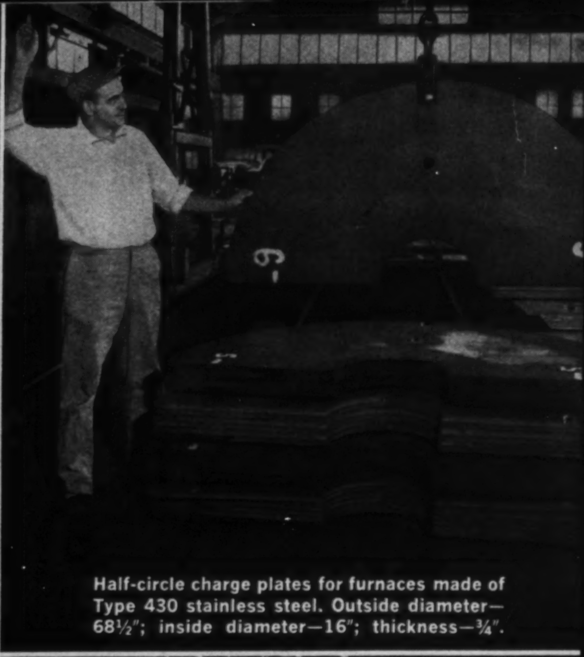
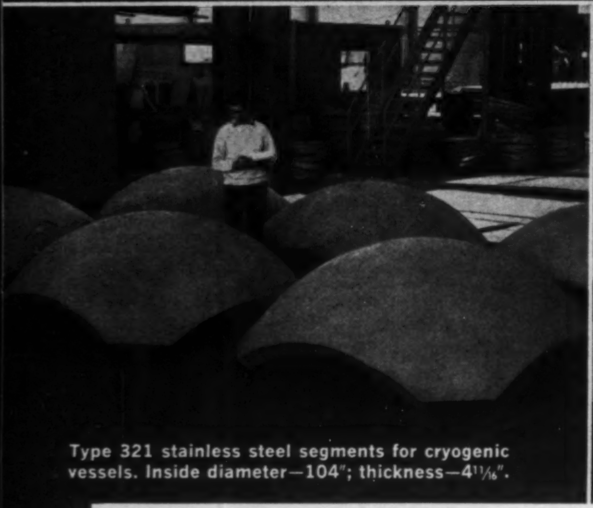
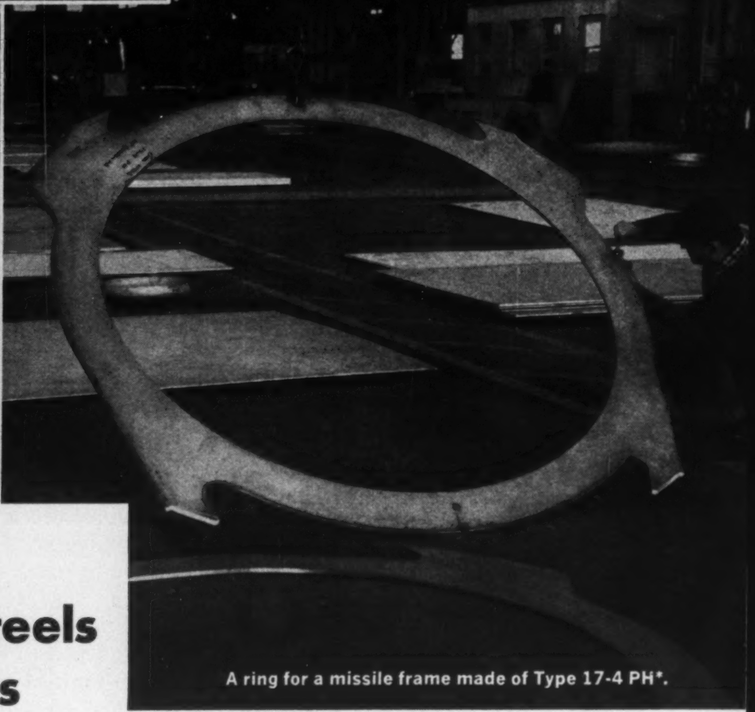


Half-circle charge plates for furnaces made of Type 430 stainless steel. Outside diameter—68½"; inside diameter—16"; thickness—¾".



Type 321 stainless steel segments for cryogenic vessels. Inside diameter—104"; thickness—4$\frac{11}{16}$".



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1961 Foreign Car Imports Drop

But Next Year They're Likely to Rise Again

Foreign producers have shaved their inventories to compete with American compacts.

A change in the export rate of U. S. models to European countries is unlikely.

By A. E. Fleming

▪ The balance between new car imports and exports in the U. S. will be more favorable in 1961 than any year since 1957.

About 260,000 foreign autos will arrive in the U. S. during 1961, while 115,000 American units are shipped from our shores.

The surplus of 145,000 units in favor of foreign makes is their smallest margin in four years. Differences in recent years have been: 1960—300,000 more imports than exports; 1959—552,000 more imports; 1958—305,000 more imports; 1957—99,000 more imports; 1956—85,000 more exports; 1955—197,000 more exports.

May Grow Again — Looking ahead to 1962, it appears the import margin may expand again, possibly outnumbering exports by as much as 260,000.

The reason is that after two years of struggle, foreign car producers finally seem to have reduced their stocks of models in this country to a satisfactory level.

Inventory cutting has been going on ever since foreign makes felt the first stings of competition from American compacts at the start of 1960.

38,000 Drop—In the first quarter of 1960, foreign companies sent an average of 59,000 cars a month to the U. S. The rate fell to 45,000 monthly in the second quarter, to 23,000 monthly in the third quarter and 21,000 monthly in the fourth quarter of 1960.

During 1961, imports have averaged about 21,000 a month. Between 40,000 and 50,000 new foreign cars are believed stocked now in the U. S.

Overseas officials indicate they will carefully keep supply (imports) in line with demand (sales) throughout 1962. This means imports during the coming year could average some 30,000 a month, since the experts predict 400,000 foreign car sales in 1962.

Exports Unchanged—If the 400,000 mark is reached, it might easily exceed U. S. exports next year. Exports have been around 2 pct of total domestic production in recent years. And no significant change is likely.

Since the 1962 car output forecast is for between 6.1 and 6.8 million units, 120,000 to 140,000 may be sent abroad.

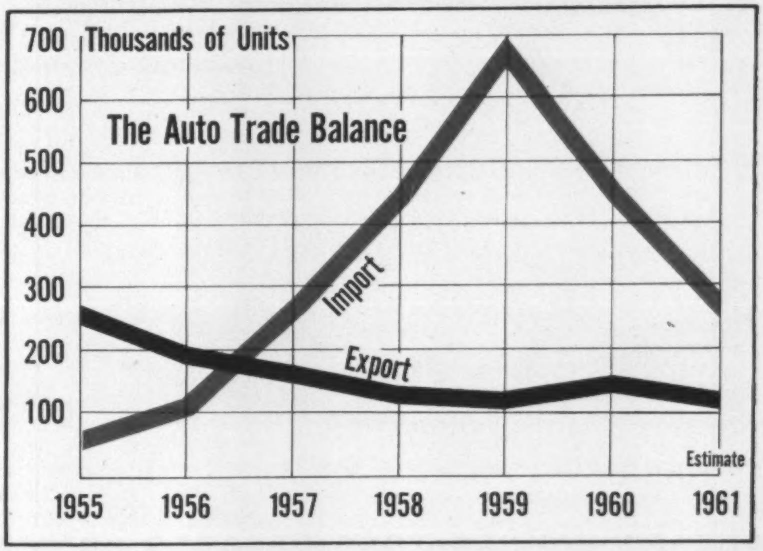
Ford's Cardinal could upset the import-export picture. But there is little chance of a big pickup in U. S. exports to Europe.

Built Overseas — The Cardinal will be built overseas for markets abroad.

Foreign manufacturers apparently won't have to worry about the little Ford for awhile. It isn't expected on the market until at least next September.

But there's also little doubt that the advent of U. S. compacts has had an effect on sale of foreign cars. It's doubtful if they have more than slowed the trend, but they have cut into the market with those who want a small car, but prefer one made in the U. S.

Is Import Trend Reversed?



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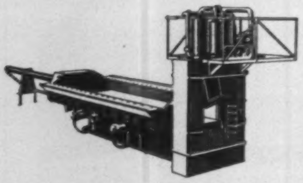

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Defense Buying Policy Stiffens

Military Wants More Might for the Money

Pentagon spokesman outlines new requirements military has for defense contractors.

Air Force Gen. Bradley explains new attitude in West Coast defense industry center.

By R. R. Kay

- Don't try to get away with substandard defense work.

Value Drive—Pressure is coming from congressional, governmental, and military leaders. They demand defense products be made on time and more reliably. They intend to keep a far sharper eye on costs; and insist on more value for the defense dollar.

Air Force Lt. Gen. Mark E. Bradley, Jr., Deputy Chief of Staff, Systems & Logistics, explained the policy to Pentagon contractors at a Los Angeles meeting.

New Rules—USAF has sharpened up its procurement policies. General Bradley spelled them out:

Stress is on evaluating proposals within "defense-time-dollar" boundaries.

Great heed will be given to development time.

Clear statements of requirements and performance goals are required plus simpler specifications.

Deep study of all types of contracts is wanted. New emphasis is on firm, fixed prices, and on incentives of all types.

More concern will be on engineering changes.

More reliable and more realistic cost estimates are wanted.

There is a strong drive for reliable end items. They could help do away with costly retrofits and modifications.

Industry has a right to fair profits, but it's going to have to earn them.

The Alternative—If a company doesn't measure up, it'll have a tough time getting any business. This applies not only to the USAF but all the services, the General says.

Nehru in Los Angeles

Indian Prime Minister Nehru, on a recent visit to Los Angeles, was asked by The Iron Age: "How can U. S. industry foster a greater relationship between our two countries?"

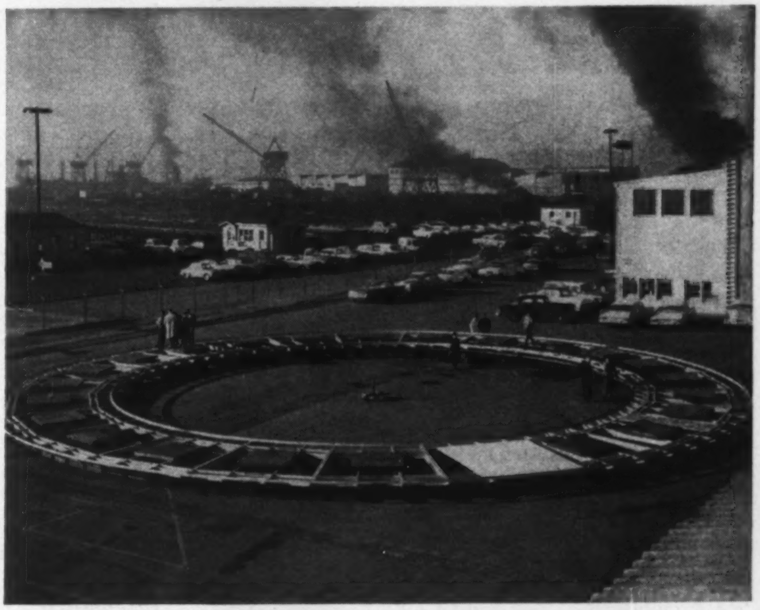
Prime Minister Nehru's candid reply: "There's plenty of room in India for more U. S. industry. Indeed, it's very welcome.

A Long Haul—"We have raised our standards of living. But we have a long way to go. And our resources are limited.

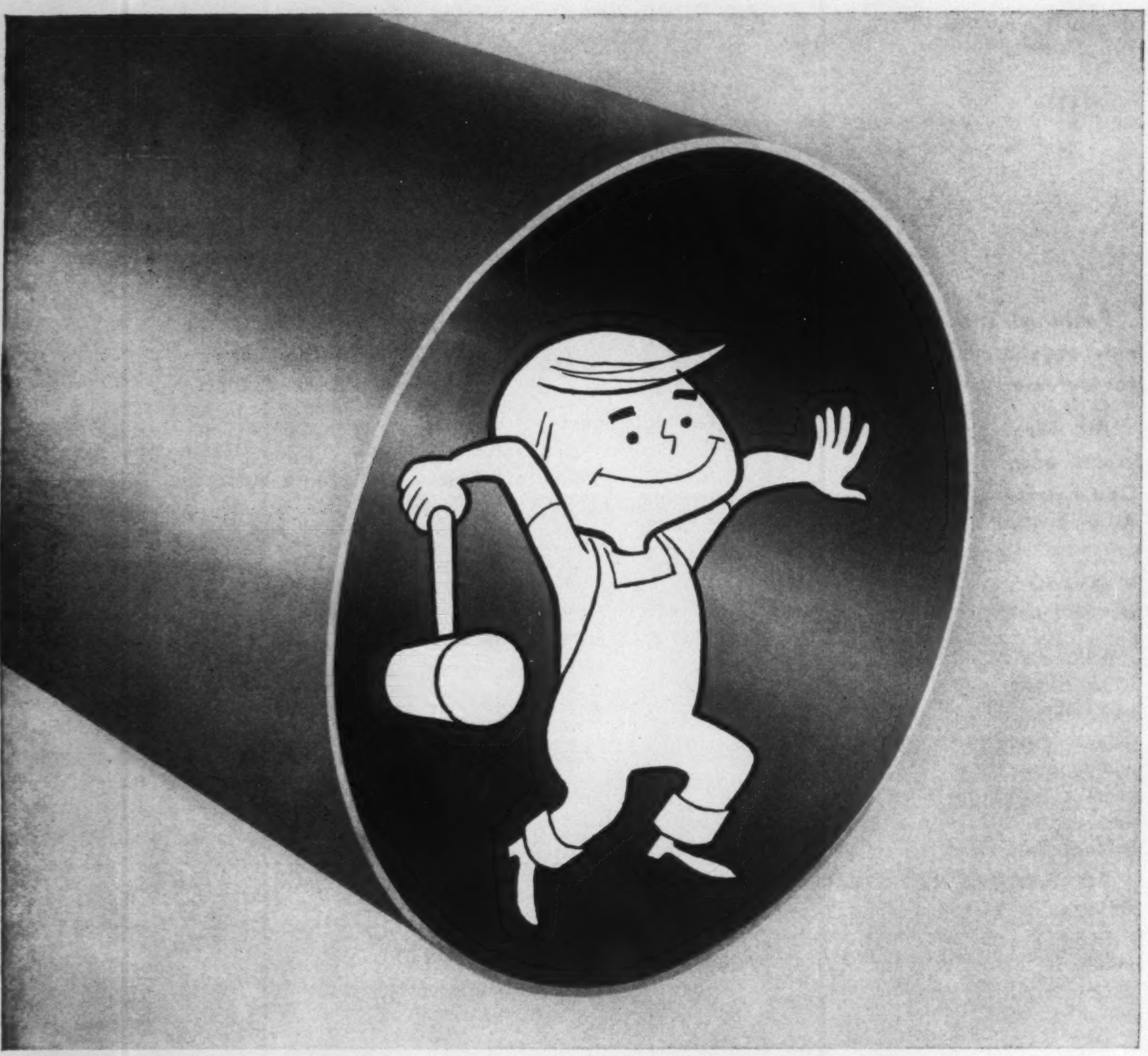
"Right now, my people need the necessities of life—not the luxuries. We're in our third five-year plan. American manufacturers who can help us to further this plan are most welcome.

"Let me assure you, they'll find a good climate for their work in my country," the Prime Minister said.

Ready to Go Aloft



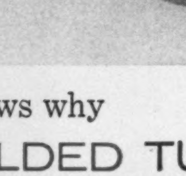
DINING AROUND: Western Gear Corp. is assembling the turntable for the Eye of the Needle Restaurant which will revolve atop a 500 foot Space Needle at the Seattle World's Fair. Work is being done in Everett, Wash.



"The Gravity Kid" shows why

CONTOUR-WELDED TUBING OFFERS GREATER FATIGUE STRENGTH, LONGER SERVICE LIFE

Tubing fatigue strength depends largely *on how the tube is welded,* and the results obtained. Tubing that's smooth inside — free of flaws and bulging weld beads — offers much greater fatigue strength and longer service life.



Contour-welded* *tubing is smoother inside* than conventionally-welded tubing. It's smoother because *it's welded at the bottom.* Gravity pulls the metal down so that the weld corresponds to the tube's inside contour. There's no bulge on the inside surface. Even on the outside, the seam closely conforms to the tubing shape.

Contour-welding provides greater strength than conventional welding, because in conventional welding, gravity pulls the molten metal down into the tube. This can form a bead that is difficult to remove by cold working. And cold working can lead to deep, sharp undercuts that seriously weaken the tube.

Contour-welded tubing is smoother than seamless, too. That's because it's formed from uniformly rolled strip steel; whereas, seamless is produced by extruding or piercing. This strip is 100% inspected. So, there are no undetected tears or fissures inside.

See for yourself why Contour-welded tubing offers greater fatigue strength, longer service life. Write today for our free 48-page manual which describes tubing sizes from 1/8" to 40" O.D., in stainless and high alloy steels, titanium, zirconium, zircalloy, and Hastelloy**.

**U.S. Patent 2,716,692*

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Possible Buying Surge Forecast

H. G. Bixby: "We Must Restimulate Our R&D"

Ex-Cell-O Corp. head says business could skyrocket in the months ahead.

But it depends on the defense situation and the plans of auto producers.

By R. H. Eshelman

NUMERICAL CONTROL: H. Glenn Bixby, president of Ex-Cell-O Corp., credits numerical control with keeping U. S. ahead of foreign competition.

▪ There could be a big surge in machine tool buying in the immediate months ahead. So says a leading industry authority, H. Glenn Bixby, president of Ex-Cell-O Corp. An astute financial analyst, he has often called the turn in the past.

Speaking before the recent meeting of the National Industrial Conference Board in Detroit, he singled out a number of volatile factors that could skyrocket machinery business.

For instance: Mobilization with emphasis on conventional weapons; or a decision by the auto producers to invest heavily in new automated machinery. Another way would be a consumer buying splurge, although Mr. Bixby predicts a long time-delay before effects would be felt in heavy tools.

Big "IF" — In analyzing these possibilities, he pointed out a big "if" before each. Take defense mobilization. More than 60 pct of all machine tools are more than 10 years old. They are hopelessly obsolete to meet challenges of a national emergency.

Mr. Bixby feels a deeper world crisis suggests a machinery boom, because emphasis might be placed on conventional weapons. This again would call for mass production, which means machinery. In contrast, the nation's present defense arsenal consists largely of non-mass production type hardware.

Timing Question—As for automotive prospects, the big question is: When?

"Advances in automation and machine productivity have been spectacular in the past three or four years," says Mr. Bixby, adding:

"There's every reason to expect automakers to take advantage of the opportunity to increase production efficiency and reduce cost."

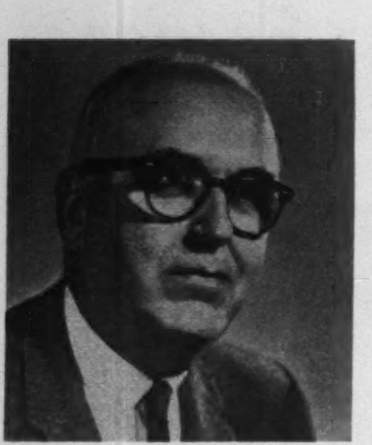
Determining Factors — Timing, feels Mr. Bixby, will depend on volume of autos sold next year and the industry's plans for significant design and engineering changes. These in turn would require extensive new tooling and equipment.

"Potentially, the auto industry could have a substantial influence on the machine tool industry," Mr. Bixby declares. However, if it should come in 1962, such investment would influence orders rather than shipments, he believes. As a result, he is skeptical of this factor exerting significant upward pressure on machinery output in the coming months.

Nothing New—"Too many companies have nothing really new to offer," he said, adding: "We must restimulate and reemphasize our research and development efforts. We must modernize our own plants, tighten cost controls, increase productivity of both our machines and our labor force."

He called for a united effort to improve depreciation policies.

MEN IN METALWORKING



R. A. Schlegel, appointed president, Republic Flow Meters Co., subsidiary, Rockwell Mfg. Co.

Chrysler Corp.—J. B. Kendall; D. A. Milton; W. T. Hanlon, named plant managers, Stamping Group.

General Dynamics Corp. — Dr. M. M. Marisic, appointed manager, research and development dept., Liquid Carbonic Div.

KuBar, Inc.—K. P. Duquette, appointed manager, components manufacturing; Heino Ekker, named manager, quality control.

Western Gear Corp. — L. A. Myhre, appointed manager, Heavy Products Div.

United States Steel Corp.—A. L. Murphy, appointed manager-operations, Sharon, Pa. district, U. S. Steel Products Div.

Harnischfeger Corp.—R. O. Fish, appointed general superintendent, West Milwaukee plant.

Republic Aviation Corp.—E. S. Glines, appointed general manager, Missile Systems Div.

New Jersey Zinc Co. — T. C. Young, named manager, commercial development group.

Aro Corp.—H. S. Ormsbee, appointed general manager, international operations; A. W. Moran, named export sales manager.

Thompson Ramo Wooldridge, Inc.—D. P. McKinley, named manager, Western Region, Replacement Div.

Capehart Corp.—S. B. Fishbein, appointed director, military programs.

Republic Steel Corp. — S. F. Joynt, Jr., appointed asst. chief metallurgist, Buffalo district plant.

Radio Corp. of America—J. E. Sloan, appointed manager, advanced engineering products, Major Defense Systems Div.

J. J. Lohrman, elected vice president, administration, and a director, Russell, Burdsall & Ward Bolt and Nut Co.

Cohu Electronics, Inc.—R. L. Harmon named manager of technical information, Kin Tel Div.

Royal Industries, Inc.—H. J. Fitzpatrick appointed manager, contract administration, Vard Div.

Ideal Electric and Manufacturing Co.—C. C. Libby named marketing manager.

Taylor Fibre Co.—P. M. Smith, named manager, physical analytical chemistry group; R. P. Davis, named manager, control laboratory.

Hughes Aircraft Co.—J. R. McCharles named manager, Guidance and Controls Div., Stamping Group.

Continued on p. 132

E. A. Cleary, Jr., elected executive vice president, Warner Electric Brake & Clutch Co.

J. S. Allt, named executive vice president and treasurer, Leece-Neville Co.

P. C. Eberhardt, elected executive vice president, Super Tool Co. Div., Van Norman Industries, Inc.

MORGAN MILL FAST INCREASES BETHLEHEM'S RE-BAR CAPACITY

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ADAPTABLE FOR SIZE CHANGE AND SPECIAL CUT-OFF

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(Continued from p. 130)

Reynolds Metal Co. — W. H. Caruthers, Jr., named assistant manager, chemical process industries markets.

Bethlehem Steel Co. — C. L. Squier appointed general manager, Lackawanna, N. Y., plant.

Republic Steel Corp. — W. J. Shand appointed chief shipper, Warren, O., district. J. O. Shute, Jr., named assistant sales manager, Wire Div.

Evans Rule Co.—W. W. Gentino named sales manager.

Illinois Tool Works, Inc.—L. G. Wrigley joined corporate staff as director of automotive marketing.

Master Power Corp. — T. H. Maddux appointed general sales manager.

General Electric Co. — W. G. Chaney appointed manager, mobile telephone systems engineering and personal communications engineering, communication products dept.

Royal Industries, Inc.—Norman Seymour, named works manager, Vard Div.

Vitro Corp. of America—R. R. Stephens, appointed chief electronics engineer, Vitro Electronics Div.

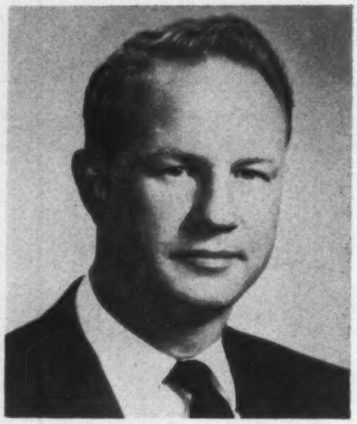
Babcock & Wilcox Co.—J. D. Stephens, named manager, nuclear and special products, Boiler Div.

Edgcomb Steel of New England, Inc.—K. J. Scarks, named manager, office operations, Nashua, N. H.

McNally Pittsburg Mfg. Co.—A. L. Thurman, appointed general manager, McNally-Bird Engineering Co., Ltd., Calcutta, India.

Jones & Laughlin Steel Corp.—N. E. Willkomm, named manager-tubular sales, Steel Warehouse Div.; C. O. Kelley, joined the Cleveland Steel Service Center as sales manager.

Aluminum Company of America—M. J. Pastrick, Jr., named plant manager, Rea Magnet Wire Co., Inc.



W. A. Tedford, named vice president, Republic Flow Meters Co.,

United States Steel Corp.—J. A. Bacon named district operations' manager and J. F. Uhlik appointed production superintendent both in the Steel Products Div.

Frederick B. Stevens, Inc.—C. V. Bogart named foundry sales manager.

Gleason Works—H. J. Hart appointed export manager.

American Screw Co. — P. J. Roddy named general sales manager. American Screw Co., is a division of Noma Lites, Inc.

Corhart Refractories Co.—J. K. Meyer named assistant to the president and B. P. Colosky named general sales manager.

Foote Bros. Gear and Machine Corp. — G. P. Lavold appointed sales manager, gear products.

Anaconda Aluminum Co.—P. T. Persons named district manager, West Coast; D. W. Sargent, Jr., named district manager, New York.

American Welding & Manufacturing Co.—T. F. Knox named a district sales manager, and J. R. Hofius named a district sales manager both in the Industrial Products Div.

The Rotor Tool Co. — M. K. Wagy named sales representative Iowa and Western Illinois. Sid Fidyke named sales representative, Texas.

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NEW...THIN, FUSED DEPOSITS WITH CONTROLLED DILUTION
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Micro Metals Corp.—J. K. Nyburg named general sales manager and elected a director.

Rosedale Foundry and Machine Co.—F. W. Boehmer named sales representative, Central and Eastern Ohio.

Amsler Morton Co.—C. L. Kerr appointed chief sales design engineer of the company, a division of Textron, Inc.

Aluminum Company of America—R. H. Wright appointed sales manager, New York.

Norton Co. — W. C. Howard named sales manager, Chicago. F. D. Wing named supervisor, distributor sales.

Bethlehem Steel Co.—Dr. I. M. Viest joins sales engineering staff.

Carpenter Steel Co. — W. E. Lowles named mill sales representative, Alloy Tube Div.

Calumet & Hecla, Inc.—E. J. Campbell named district manager, Chicago. R. C. Cash named market research manager, Research & Development Div., and R. C. Crowe named manager, Cleveland and Detroit districts. All men are connected with the Wolverine Tube Div.

Arwood Corp. — W. A. McKnight named representative.

Republic Steel Corp.—W. F. Potter appointed district sales manager, Truscon Div.

Swedloy, Inc.—E. J. Svec joins sales staff.

The Bendix Corp.—D. M. Prichard appointed Southwest Sales Engineer, industrial controls section.

Black and Decker Manufacturing Co.—M. D. Mooers appointed district manager, Miami; P. B. Wayman named district manager, Pittsburgh; J. R. Steffey appointed sales representative, Dallas; G. H. McLain named sales representative, Baltimore; B. F. Meyers appointed sales representative, Denver; and A. J. McMillan named sales representative Los Angeles.

Leo Catallo, elected vice president, Wheel Trueing Tool Co.

Link-Belt Co.—G. E. Snyder, appointed district manager, Indianapolis.

Brown & Sharpe Manufacturing Co.—H. A. Szostek, appointed sales manager, Cutting Tool Div.

Aluminum Extrusions, Inc.—D. E. Gill, appointed sales manager, Extrusions Div.; W. G. James, appointed sales manager, Fabrication Div.

Dixon Sintaloy Inc.—P. R. Lochner, appointed general sales manager, powder metallurgy products.

Hancock Telecontrol Corp.—A. H. Hardwick, Jr., appointed district sales manager, New York.

McKay Co. — R. M. Gee, appointed Eastern district sales manager, Chain Div.

Metal & Thermit Corp.—N. H. Dewing, Jr., named representative, International Div.

Colorado Fuel and Iron Corp.—M. R. Harbour appointed assistant district sales manager.

Allied Research Products, Inc.—P. J. Guinther, Jr., appointed sales engineer, Pittsburgh area.

Morey Machinery Co., Inc.—J. J. Hogan, appointed asst. to the president.

(Continued on p. 134)

Capacability means Readiness

When it comes to refractories, *readiness* is Basic. You won't have to be "on guard" against slow shipments when you rely on Basic. Steelmakers know its eight plant network stands ready to supply a complete line of granular and tar-bonded refractories at the flick of a finger.

Supporting the company's main plant at Maple Grove, Ohio are other facilities in Ohio, Indiana, New York and Nevada. With the largest resources in the granular basic refractory industry, Basic has an annual capacity of well over a million tons.

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the air line with the BIG JETS
GENERAL OFFICES: ATLANTA, GEORGIA

(Continued from p. 133)

Joseph T. Ryerson & Son, Inc.—W. J. Kotowicz, appointed manager, aluminum sales, Houston.

Morrison Steel Co. — J. P. O'Brien, appointed district sales representative, Philadelphia area.

Mills Electronics Group—R. L. Stone, named instrument and control systems product manager, electronic and mechanical defense products dept.

Hyster Co.—L. J. Levisee, appointed director, purchases.

Wheeling Corrugating Co.—F. S. Neal, named asst. general sales manager; R. S. Hughes, appointed manager, fabricated sheet metal products department; A. V. Hand, named manager, Wheeling Sales Div.; Paul Redosh, named asst. manager, Wheeling Sales Div.; E. A. Kalkreuth, appointed field sales supervisor, Wheeling Sales Div.; J. A. Howells, named asst. manager, Louisville, Kentucky branch.

Amchem Products, Inc.—C. R. Wirshing, appointed asst. general manager, Western Div.

Inductotherm Corp. — R. F. Goodwin, appointed district sales manager, New England.

Minneapolis - Honeywell Regulator Co.—A. R. Parsons, appointed sales supervisor, scientific products, Eastern region.

Kaiser Aluminum & Chemical Corp.—J. D. Murphy, named operations manager, Wire & Cable Works, Bristol, R. I.; J. H. Adamson, named manager, extrusion plant, Halethorpe, Md.

Grant Pulley and Hardware Corp.—H. L. Belanger, appointed New England sales representative, Industrial Div.

Union Carbide Corp. — P. M. Smurthwaite, appointed manager, oxweld plant, Newark, N. J., Linde Co. Div.

Marquardt Corp. — Dr. J. G. Frayne, appointed manager, data systems dept., Pomona Electronics Div.

C. E. Webbe, appointed general manager, Anaconda Metal Hose Div., Anaconda American Brass Co.

Parker-Hannifin Corp. — A. B. Goodwin, appointed district manager, distributor sales, Eastern Canada.

Ettco Tool & Machine Co., Inc.—John Conrad, appointed Chicago district manager.

General Electric Co. — W. M. Jenkins appointed manager of European operations for the information and control systems product section. W. F. Squires, named sales manager, Army programs; R. O. Richards named manager, contracts; C. L. Smith named manager, product planning and R. C. Schmid named manager Western district. All within the Heavy Military Electronics Dept.

Granite City Steel Co.—F. A. Tiarks named general manager, Granco Steel Products Co.; O. O. Roberts, Jr., named general sales manager and C. E. Eck appointed assistant general sales manager of the parent company.

Westinghouse Corp.—Dr. R. E. Fox appointed manager, physics dept., research laboratories.

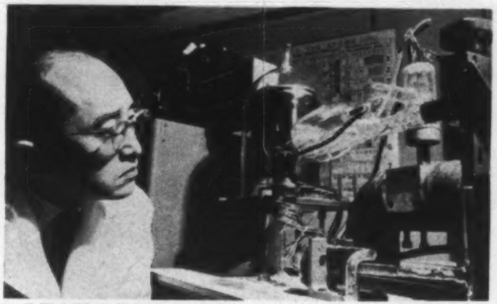
Martin Marietta Corp. — R. R. Porter, appointed Midwestern district manager; G. V. Clokey, appointed Pittsburgh-Cleveland district manager; L. V. Koerber, appointed Eastern district manager. All of the Standard Lime and Cement Co. Div.

Satellite for Amateurs

The Air Force will launch a tiny satellite into space next month for experimental use by the world's ham radio operators. Called OSCAR, the 10-lb satellite will be carried aloft as a passenger aboard a Discoverer satellite. Ham operators will check communication networks through the satellite for 30 days. OSCAR means Orbiting Satellite Carrying Amateur Radio.

When Is a Leak, a Leak?

Two-thousand miles in space is no place to spring a leak. Here, vacuum registers 10-13 mm mercury. Dr. T. H. Lee, General Electric Co., claims a new detector finds a leak in a container in terms of 1 cc in 500,000 years. To do this, researchers have studied the motion of gas in solids. Molecules of gases such as helium pass right through metal. Once this rate is established, then an accurate leak check can be made.



LEAK DETECTOR: Checks gas molecules.

Freight Rates for Space

Computers are already estimating freight costs to other planets. When the nuclear rocket NERVA is figured in, prices drop sharply. Cargo could go to Jupiter for $0.70-$40.00 per lb. The tab for a run to Pluto would be $8-$100 per lb. The catch: A trip to Pluto will take about 30 years.

Controlled-Depth Boring

A precision boring machine which repeately drills holes to depths controlled to within 0.0002 in. has been developed by Northrop's Nortronics Div. The unit will be used on airframes. Holes can be bored to ±0.0001 in. diam and opposing hole alignment can be held to within 0.0005 in. The machine consists of two reciprocating spindles, mounted in opposed positions, on a granite surface plate for stability. Two motors are mounted on the machine's base to minimize vibrations.

Possible Space Lubricants

NASA recently commissioned the National Research Corp. to study two organic compounds as lubricants for bearing systems. These compounds are an industrial dye and a biological compound secreted by the human body. If successful, the would-be lubricants will fill many jobs in the realm of outer space.

Space Study Used in Mill

New techniques in satellite and radio-telescopic detection of elements in space are giving metals technology a big boost on earth. Miniature mass spectrometers used in space probes will be used soon in steel mills to control alloying processes. Recent NBS studies with paramagnetic-resonance methods aim to improve radio-telescope spectra search. When perfected, this will add greatly to the knowledge of interstellar gas clouds and planetary atmosphere.

Studies Re-Entry Materials

A dish which serves up enough solar heat to turn most metals into liquids has been developed by Goodyear Aircraft Corp. Called a solar concentrator, the unit will test materials for space vehicles. The 8-ft diam parabolic dish can be used to focus 6000°F on metals, ceramics, sublimation-cooling coatings and thermal plastics. The reason: To simulate atmosphere re-entry conditions. First dish goes to Arizona.

Rocket 'Brake' for Moonshot

What will keep the payload from clobbering into the moon's surface? Thiokol Chemical Corp. has a multi-million dollar contract to find out. Designers have come up with a 37-in. solid-propellant retro-rocket engine. This engine will decelerate the instrument-laden spacecraft as it prepares for a soft landing on the moon.

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For a higher standard of quality and lower maintenance costs specify Midvac Rolls for your mill. Midvale-Heppenstall also makes forged steel rolls of any size, for any purpose required for rolling of steel, aluminum, copper, bronze and other metals . . . as well as paper, plastics and rubber. Write for complete details to . . .

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How Aluminum Extrusions Bid For Custom-Styled Jobs

By **C. R. Henry**—Vice President, Manufacturing, Aluminum Extrusion, Inc., Charlotte, Mich.

More and more fabricators are making use of aluminum extrusions for making custom-styled parts.

Let these case histories point up the reasons behind this trend.

■ To aid engineers in meeting demands of today's custom-styled products, aluminum-extruded parts offer product improvement and lower costs for a wide assortment of jobs.

Tooling for aluminum extrusions is simple, highly flexible and can be produced at little cost.

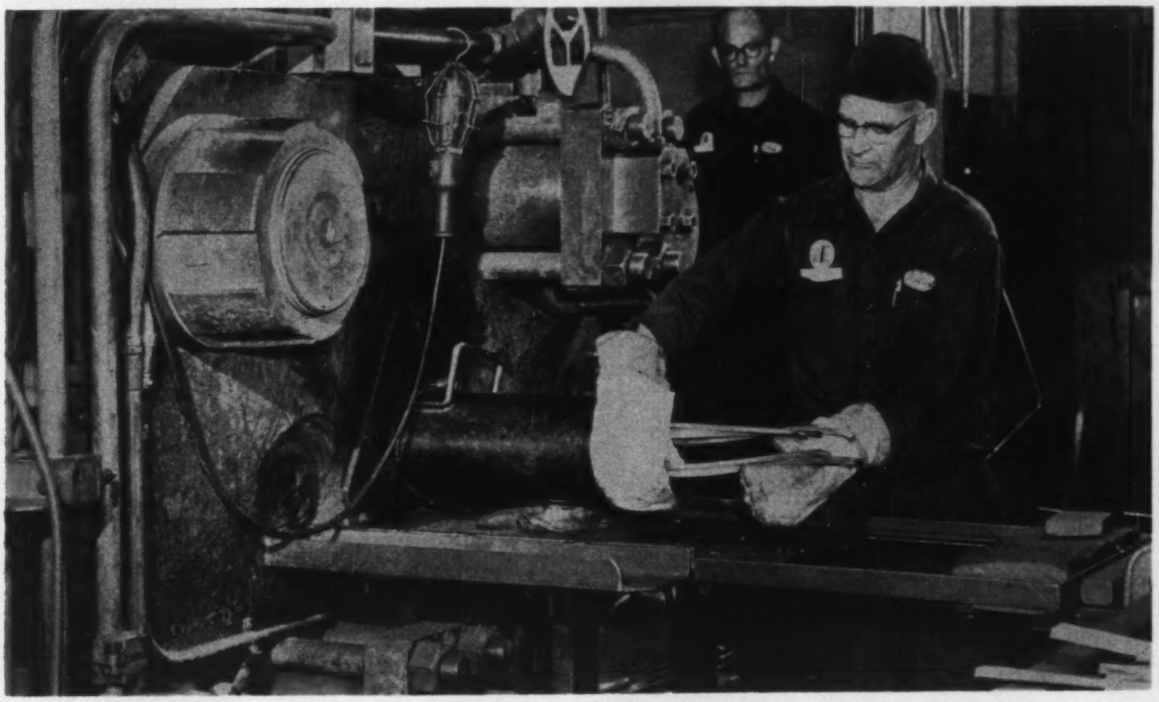
Low and High Production—The low tooling cost and other traits of the process make extruded parts adaptable to low-production runs. However, by redesigning, improving fabrication steps, and automating some manufacturing steps, this method now competes with higher-production methods.

Consider this example. It concerns a broiler and oven door for a new gas range. Aluminum extrusions were chosen. Why? Because they are the most economical and practical method for making the initially-predicted low-volume sales of this appliance.

Cost of tooling the complete job for extrusion amounted to less than $2000.

Needs Three Dies — Only three separate extrusion dies are needed for both doors. One die extrudes the outer frame; another extrudes the inner frame; the third extrudes the spacer for both doors.

Both doors are the same height but one door is wider than the other. Inner- and outer-end extrusions on both doors are the same. Top and bottom components differ only in length. And by cutting the extru-



EXTRUDE DOOR FRAMES: Oven-door frames are being extruded from press. Extrusions are slightly twisted when emerging from die. They are straightened and cut to length after run has been completed.

sions to the required length, the same die can be used for both doors.

Any variation in door size can be made with a small tooling change. Moreover, with only a small investment in tooling — $100-$150 — a new die can be made for a new door design. Thus, the appliance maker could actually see how a new door design would look without any large investment in tooling or production steps.

Takes a Face Lifting — For a model change, only the visible surface of the die needs face lifting. The unexposed surface of the extrusion remains the same thus eliminating costly re-engineering and retooling.

Also, designers find that extrusions permit easy assembly and disassembly of the doors. Glass can be easily removed for quick cleaning or replacement in the home. The glass slips between a channel; a removable door handle holds it in place.

Other advantages to using aluminum extrusions for making the doors include weight, heat stability and appearance.

Finishes Are Varied—With extrusions contrasting finishes on the door front can be easily and economically achieved. On the oven door there are three different finishes.

The outer frame is etched and anodized. The spacer is etched, anodized and painted. The inner frame is buffed to a high luster and anodized. These varying contrasts would be difficult and costly to achieve otherwise.

Extrusions can be finished by buffing, color anodizing, texturing, or painting. (And there's no tooling cost.) This versatility allows one design to take on a fresh look; it also differentiates a standard part from a custom part.

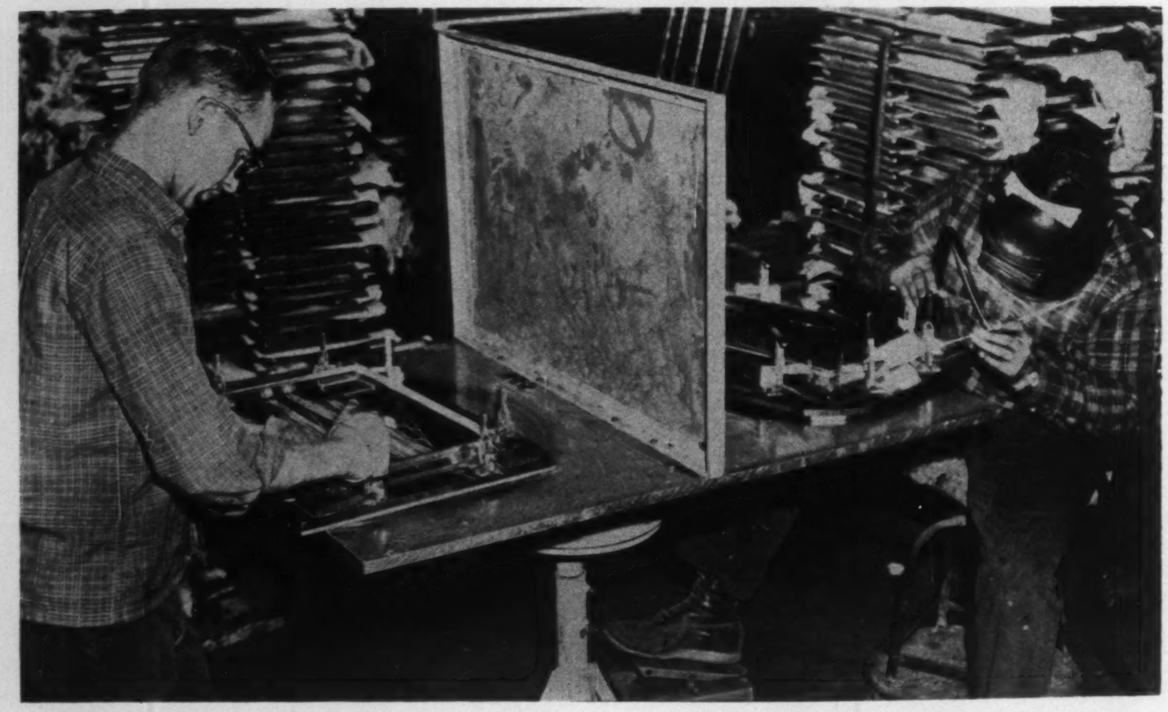
Three Sections—Each door consists of three separate fabricated extrusions—an inner frame, a spacer, and an outer frame.

The inner frame consists of four pieces of extruded lengths that are assembled and welded. The outer frame is made of one piece that is notched, formed and welded. The spacer is extruded and cut to length. A recessed area is painted black.

There's a unique built-in design feature. The channel that holds the glass on the inner extrusion is extruded with serrations that act as retainers for screws. Thus, the back plate that holds the glass in place can be fastened anywhere along the length of the extrusion. This eliminates positioning problems and the need of drilling and tapping holes in the extrusion.

Stake on Punch Press—The inner and outer frames are assembled with the spacer and are then staked together in a punch press. A hole, drilled on the front of the inner frame, allows the handle to be mounted. Welding the assembly comes next.

After the initial production of the door, sales of the gas range zoomed beyond the original estimate of 4000 ranges per year. As a rule, when volume increases, the economic advantage of extrusions decreases. But



TURNTABLE CUTS DOOR COSTS: Inner frame of oven door is assembled and Heliarc welded on a turntable. This simple feature helps to reduce costs of the doors when production is stepped up.

redesign of the part and development of simple fabrication methods gave a 14 per cent cost decrease on the fabricated doors. Result: Cost of the assembly stays competitive.

One of the cost-saving features was a basic redesign of the door. The original door design calls for assembling the outer frame into a step in the inner frame and staking in position. This requires a positioning step. Moreover, the staking operation shows through the front of the door.

Protects Appearance—The new design permits the inner frame to slip under a lip on the outer frame. This method eliminates the positioning problem and permits staking that does not affect the appearance of the door.

A new assembly operation speeds production. Previously, the welder both made and welded the frame assembly. Now, by use of a turntable, one man assembles the frame and another does the welding.

To tap the hinge holes in the outer frame, in which brass inserts are placed, a fixture was developed that accurately positions the frame for simultaneous tapping of both holes.

The doors are delivered as a complete unit. The only assembling required by the appliance maker is installation of the glass, handle, and brass inserts.

Cost Advantage—Another example concerns a control-panel frame for a home laundry washer and dryer. Aluminum extrusions showed a very definite tooling and piece-price cost advantage. The extrusion tooling costs amounts to $3000.

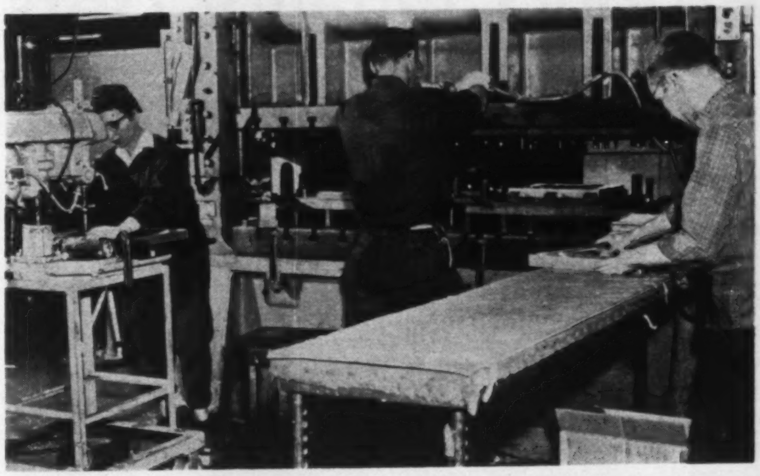
The control-panel frame consists of two separate extrusions. Originally, the frame was designed as a one-piece frame to reduce manufacturing costs. This change adds one welding operation but eliminates some previous forming and piercing operations.

Make Substitutions—Another advantage of a two-piece frame extrusion is that if one extrusion is damaged, it can be discarded and a new piece substituted without the loss of the entire frame.

During production, the extrusions travel via conveyor to a central assembly area. One extrusion is notched and formed into the top and two sides of the frame. The other extrusion forms the bottom of the frame. Assembly is by heliarc welding.

The frame extrusion has serrations that act as retainers for screws. These permit the control panels to be easily and quickly fastened to the washer and dryers.

NOTCHES IN THREE PLACES: Special milling setup automatically notches extrusions in three places for subsequent forming operations.



STAKES, DRILLS, WELDS: Final assembly includes staking on a punch press followed by drilling the handle holes, then welding.

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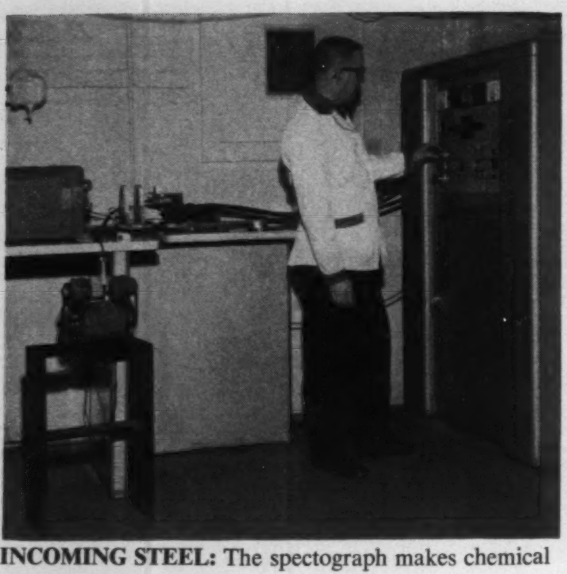
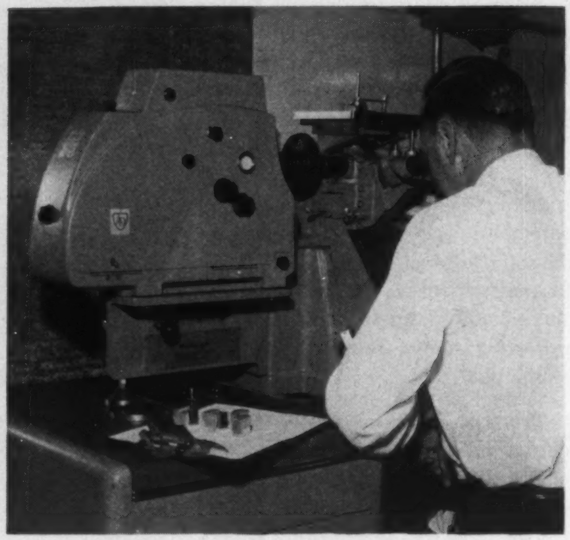


INCOMING STEEL: The spectograph makes chemical analysis on samples taken from inbound steel shipments.



GRAIN SIZE: The metalloscope is used to check all metal for grain size and nonmetallic inclusions.

Product Quality Gets Big Lift From In-Line Metallurgy

The metallurgical lab can be a valuable production tool.

It is useful to quality control and to purchasing. An up-to-date, fully equipped lab will contribute to work flow and to the profit picture, too.

▪ Some time ago, management at Dresser Manufacturing Div., Dresser Industries, Inc., Bradford, Pa., decided to move its metallurgical lab from its remote location to a new site alongside the assembly line. Management wanted to insure that every product be of the highest quality when shipped.

According to E. U. Blanchard, director of metallurgy, it turned out to be a good decision. The fully equipped facility is close to the likely trouble spots. Problems can be solved with few delays.

The new location of the metallurgical equipment, which is valued at $200,000, has paid off in three ways. First, it's a prime factor in the quality control program. The system has reduced product failure due to faulty materials to the vanishing point.

Second, the assembly-line lab speeds the production set-up time on new products and cuts waste of materials in experimental development. Last, it is a big aid to purchasing. Buyers know which suppliers can be counted on to deliver quality alloys.

Diversified Catalog — Dresser's product line is indeed versatile. It includes pipe couplings, fittings, clamps and sleeves for high-pressure gas and oil transmission lines. Distribution systems for natural gas and water depend on these products, too. So do the chemical and process industries for piping.

The missile and aircraft industry also looks to Dresser for rolled and flash-welded rings and cylinders. It's not surprising that in the past the lab has conducted tests on hundreds of metals. The list includes mild and alloy steels, malleable iron, gray iron, aluminum, titanium, brass, copper and a number of special metals.

Here are a few examples of the kind of work the metallurgists perform. The flange mill reported excessive breakage in one of its deep-drawing operations. The material was new. Metallurgists soon found that the hardness of this material was excessive, so they suggested the introduction of an annealing step.

Kept the Material—The production run proceeded without further fractures in formed parts. Why wasn't the material discontinued? It contained certain properties which were very useful in the end product.

Then there's the case of the customer who had ordered an industrial

CARBON AND SULPHUR: Dresser's Leco equipment determines carbon and sulphur content on many metals.

CLOSER LOOK: The lab conducts macrostructure examinations of raw material and heat-treated samples.

ring part fabricated from a high-alloy material. The purchase order stated that the part be solution annealed. The metallurgical team, however, noted that the material contained a large amount of nonmetallics. Thus, welding would not be easy.

Lab studies revealed that air cooling at 215°F rather than water quenching would precipitate the carbides. Welding could then be performed with near perfect results. Orders now call for air cooling. The change is expected to reap savings in production costs, too.

Warped Rolls—Metallurgy also functions in other ways. Take the entry rolls of a roller hearth furnace, for example. After brief operation, these rolls started to warp. Of course, the rolls were replaced frequently.

The company followed the recommendation of the lab. A new roll material was specified and a change was made in the supplier. Savings here amount to $5500 per year.

Metallurgy also stepped in when the expansion plugs on one of the hydraulic expanders failed after only a few thousand pieces. Continued failures spelled frequent downtime plus the added expense of plug replacement. To correct the situation, the engineers recommended another plug material.

Although the new plug has only been in service for a few months, it has already expanded hundreds of thousands of pieces. No wear is apparent. This plug should stay on the job for many years to come.

Factors That Count—Still another change in material, this time on a forming roll, offers two rewards. One is a marked increase in efficiency. The other is an annual saving of $2000.

Dresser's metallurgical department oversees all manufacturing processes which are related to the use of metals. This includes hot and cold forming, forging, welding, bending, sizing and heat treating.

One of the most active lab instruments is the spectograph. This unit performs qualitative and quantitative analysis on a large number of samples at high speed.

Up to Par—Each shipment of steel must pass chemical analysis and Brinell hardness tests. Steel is checked for grain size, nonmetallic inclusions and decarburization which might cause scoring on deep drawing or forming.

Macrographic equipment is also brought into play for surface inspection of deep rolling cracks or breaks. The receipt of sub-standard material is brought to the vendor's attention immediately. This is done by projecting a magnified sample on a screen. Then a photograph is taken which is sent to the supplier of the material.

Grain Structure—Metallographic structures are laid bare through the use of a metalloscope. This instrument examines the grain structures of both purchased and manufactured items. Poorly processed materials are ferreted out, and photomicrographs of the material's talo structure are taken.

Improvement of materials to conform to manufacturing requirements is still another duty of the lab. Studies made there on annealing, heat treating and stress relieving were recently completed for one area of the company. Knowledge gained here can be used to speed up manufacturing cycles.

Before new products leave the drafting board, metallurgy is consulted to reduce costs. The idea is to avoid defects and fabrication problems before the product reaches the manufacturing stage.

Investment Casting Technique Widens Magnesium Usage

It's now possible to cast magnesium shapes in eight different alloys.

Key to this development is a refinement of the investment casting process.

▪ The wedding of investment casting and magnesium has opened up new design fields for engineers. Formerly, when they wanted a combination of light weight and intricate part geometry, they had to settle for aluminum.

If they wanted magnesium, there was only one commonly-cast alloy, AZ92A. And because it was suitable for such a limited range of uses, design compromises were often necessary.

New Technique—However, recent research work in development of magnesium alloys, and in techniques for investment casting them, have radically changed that picture.

In fact, the Arwood Corp., Tilton, N. H., which produces about 80 pct of all the magnesium investment castings used in this country, now states that any shape which can be successfully cast in aluminum can be cast in magnesium as well.

"Sound magnesium castings, in actual production runs, have now been made in eight different alloys," says W. O. Sweeney, Arwood's executive vice president.

Significant Factor — "Many of these alloys, previously considered unsuited to investment casting, are actually better than AZ92A for certain specific properties."

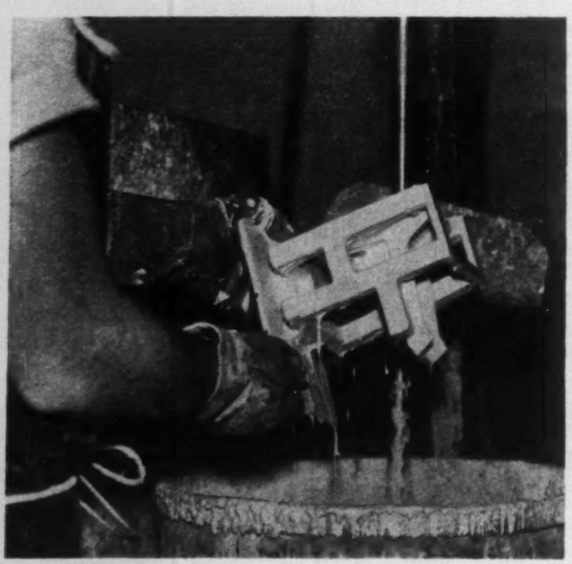
The availability of these alloys in sound investment castings is in itself a significant factor for design engineers. But there is one other development equally important. It concerns the investment - casting process itself.

Large and Smooth—This is Arwood's recent development of its ceramic - shell - casting process. It makes possible far larger castings than had ever before been produced in quantity by investment casting, according to Arwood.

A key phase of this process are the inhibitors developed by Arwood to prevent reaction of the molten magnesium with the ceramic shell. Arwood claims that it is able to produce smooth, homogeneous surfaces on magnesium comparable to the satiny finish of aluminum investment castings.

"With the ceramic-shell process," Mr. Sweeney says, "we are now making castings weighing 14 to 15 lb. Dimensions are up to 12 in. And with increased pouring capacity, now being planned, we will be able to produce parts far larger than this."

The implication is clear to the



SATIN FINISH: Key feature of molding technique is special mixture into which wax patterns are dipped. After wax is melted out, a smooth inner surface results.

MAGNESIUM USAGE GROWS: More and more designers are specifying magnesium for precision castings. Here, cable drum gets dimensional check.

weight-conscious designer. Magnesium is only two-thirds the weight of aluminum. Thus, in an aluminum part weighing three ounces, he could save one ounce by switching to magnesium, Arwood points out.

Interest is Widespread—There is strong evidence, according to Mr. Sweeney, that alert designers are anxious to take advantage of magnesium's properties whenever they are needed.

The automotive industry is a growing user of magnesium—in keeping with the trend to smaller, lighter, economical-to-operate cars. Magnesium parts in U. S. automobiles include: Transmission housing, clutch housing, timing gear, oil pump. There are many others.

Machinery of all types—especially where motion must be rapidly reversed — is another opportune market for magnesium parts. Why? Because the lighter the part the greater the reduction of inertia when its motion is reversed.

For Pushing and Pulling — The trend to making life easier for the public is another factor. It makes light-weight magnesium a natural for any piece of equipment which must be pushed, pulled, lifted, or carried. Because of this, it's finding growing use in small home appliances, power tools, photographic equipment and many other daily-used items.

Magnesium offers many other advantages in addition to light weight. One is low-gas absorption, making it ideal for uses where pressure tightness is important. Another is its strength-to-weight ratio. A third is the metal's high ratio of fatigue endurance to ultimate stress.

"All of these advantages," Mr. Sweeney says, "can be used by designers of commercial equipment, just as they have been used by the military."

Thus, with the advances in the alloys which can be cast and in the size of the castings, there is reason to believe that magnesium will become far more commonly used by designers who want and need the properties which it alone provides.

Eight Alloys That Serve Best

ALLOY	KEY FEATURES
ROOM TEMPERATURE APPLICATIONS	
AZ92A	Combination of yield and tensile strengths.
AZ91C	Combination of ductility and strength. Less tendency to porosity than AZ92A.
AZ81A	Combination of ductility and fine grain size.
AM100A	All-around combination of strength and ductility. Especially good where soundness and pressure tightness are required.
HIGHER TEMPERATURE APPLICATIONS	
EZ33A	Excellent soundness and pressure tightness in applications up to 500°F.
HK31A	Can be used up to 600°F. For short time applications. up to 700°F.
DIP BRAZING APPLICATIONS	
AZ31 M1A	Recommended for parts that will be used in dip brazing applications.

HOW STRAIGHT?: New investment-casting process permits casting of eight different magnesium alloys. Tests show close tolerances are kept.

Easy-to-Build Safety Devices Protect Piercing Punches

By **Federico Strasser**—Consultant, Santiago, Chile

Punch breakage is a costly problem. Why not curb this troublemaker at its source?

Simple overload inhibitors can be tailored right on the shop floor to match all your production-punching needs.

■ Small piercing punches always seem to break at the worst possible time. In metal stamping shops, broken punches throw tight production schedules out of mesh.

The results are threefold. Tool reconditioning ties up part of the labor force. Profits dip as rejects soar. And production losses must be borne by the company.

Frequent Overloads—Mechanical overloads are hard to avoid in most punching operations. Quite often, piercing punches undergo heavy overloads or overstresses. There are many reasons for these overloads. However, the end result is usually the same: A broken punch or series of punches.

What are the causes behind piercing-punch overloads? Misfeeding and faulty alignment are the chief culprits. Defective material, that's too hard or too thick, comes in for its share of the blame.

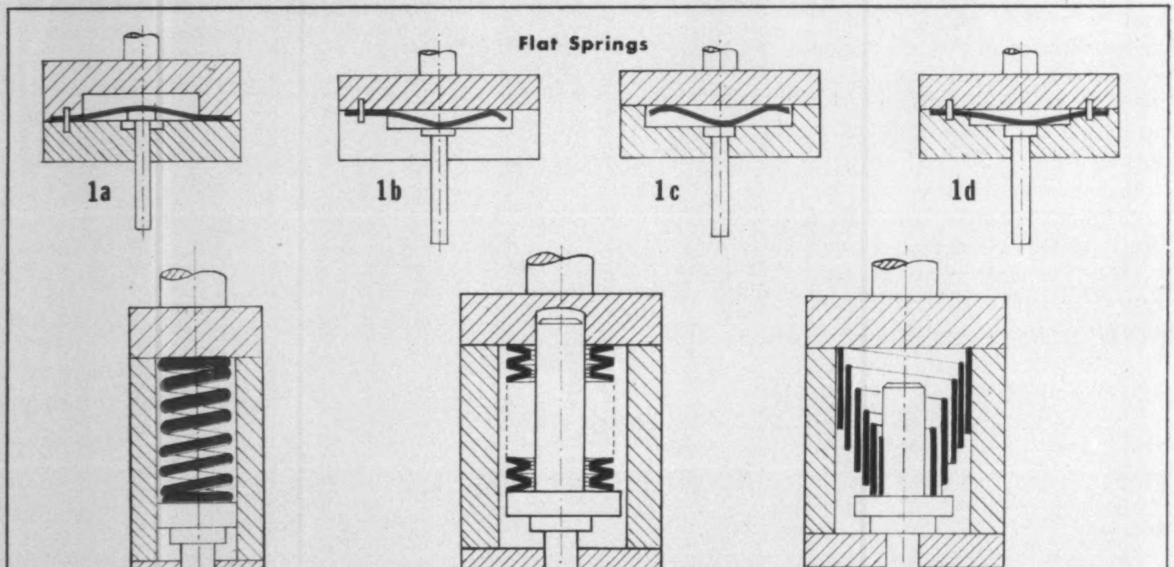
Double punching is another factor behind some overloads. The jamming of undersized slugs, caused by ejection failures, creates severe stresses on punching tools. Oversized stock, on the other hand, tends to jam inside punch nests.

Prevent Damage—Many types of protective devices can be employed to curb punch breakage. In general, these safety devices are actuated whenever an overload starts to build up. By impeding the overload, each safety device makes serious damage a problem of the past.

The intervention of a safety device consists either of shifting a tool member or rupturing an auxiliary (sacrificial) part.

There are three general groups of overload protectors. One group is

Spring Pressure Prevents Heavy Overloads



the permanent units such as springs and indexing members. Another group uses replaceable components. Shear pins and shear plates serve in these safeguard setups.

In addition, there are all kinds of special safety devices. They range from simple bending plates to complex electro-mechanical arrangements. In essence, every commercial or home-made safety device acts like a fuse in an electrical installation.

Easy to Make—Specially-designed punch holders house these overload inhibitors. Many of the safety elements are home-made low-cost gadgets. Commercial products are outside the scope of this article.

Various types of low-cost safety devices appear with this text. The first group of figures depicts simple spring arrangements. These springs resist slight overloads before they deflect.

The second group of illustrations are similar to the first. However, in Fig. 6, a hard rubber cushion performs the same function as a helical spring.

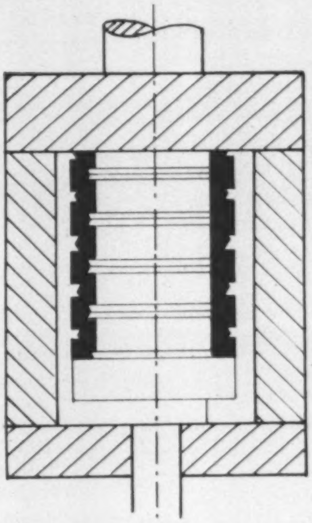
In Fig. 7, a pair of springs lock a ball-held collar in position. Heavy overloads push this collar out of its detent. This lets the piercing punch "give" instead of breaking.

Shear Members—Fig. 8 shows how shear plates serve as simple safety devices. They're placed between a punch shaft and a matching die button. Careful selection of shear-plate material teamed up with a fixed die-button diameter insures the desired overload protection.

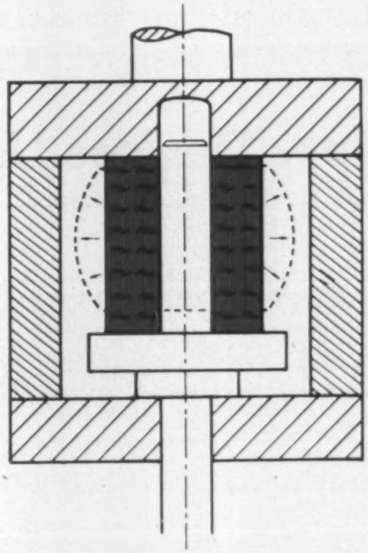
In the next illustration, shear pins take the place of the shear plates. These pins are normally made from drill rod. They're located in hardened bushings which are inserted in both the punch holder and auxiliary filler blocks.

Next, we'll study bending plates. This type of "safety fuse" consists of a piece of hot-rolled flat steel. It's positioned above the punch pad. Between the bending plate and the punch holder's upper member

Reset Problems Disappear



Ring Springs
5



Rubber Cushion
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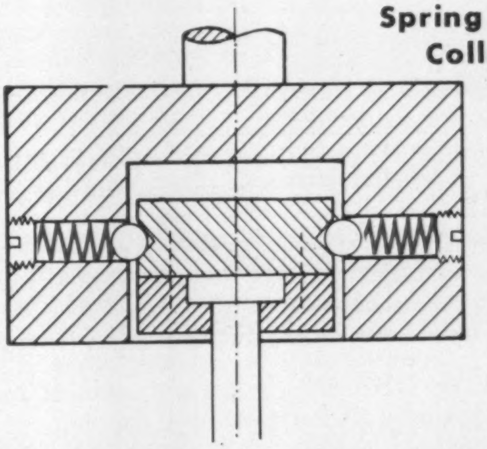

Spring Held Collar
7

there's a spacer block. This block is shorter than the distance between the two piercing punches.

Pressure Sensitive—As long as the punches aren't overloaded, the plate resists normal cutting pressures. However, if the pressure on a punch becomes too high, the plate bends upward. This action keeps the punch from breaking. Resetting of this simple safety device is effected by merely straightening the plate.

The last figure shows how a simple electrical switch is activated by an overloaded punch. Many variations are possible. This type of safety switch really earns its keep on production-punching lines.

Use Simple Formulas—Most safety devices are triggered by pressure buildups which are about 30 pct higher than the normal loads. Since shear plates and shear pins serve in most home-made punch protectors, let's calculate proper shear-member thicknesses. We'll start with the formula for calculating cutting pressures:

$$F_1 = 3.14\, d_1\, t_1\, S_1$$

Where:

F_1 = cutting force, lb
d_1 = punch diam, in.
t_1 = stock thickness, in.
S_1 = shear strength of stock, psi

We can use the same formula, by simply substituting index values, to determine shear-plate sizes.

Thus:

F_2 = force needed to perforate safety shear plate, lb
d_2 = punch-shaft diam, in.
t_2 = shear-plate thickness, in.
S_2 = shear strength of plate, psi

To allow slight nondestructive overloads, F_2 must equal $1.30\ F_1$.

Next, we'll consider a formula to pin down shear-pin conditions:

$$F_3 = 2\,\frac{3.14\, d_3^2}{4}\, S_3$$

Here:

F_3 = force needed to shear pin, lb
d_3 = pin diam, in.
S_3 = shear strength of pin, psi

Again, we should allow a 30-pct overload. Thus, $F_3 = 1.30\ F_1$.

The formulas yield approximate values. Calculated results should be verified by test runs.

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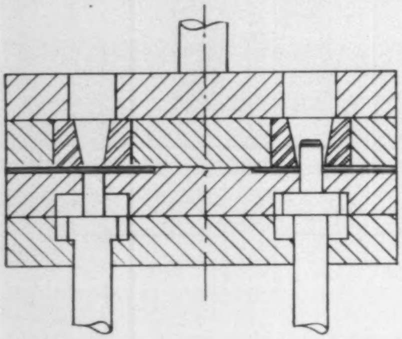
Other Safety Devices Use Plates or Pins



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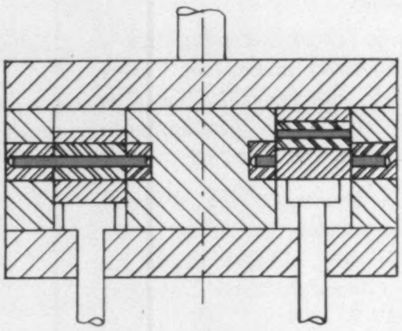
Shear Plates



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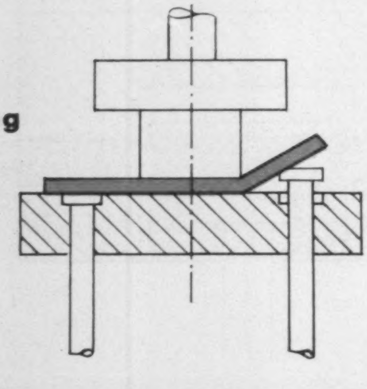
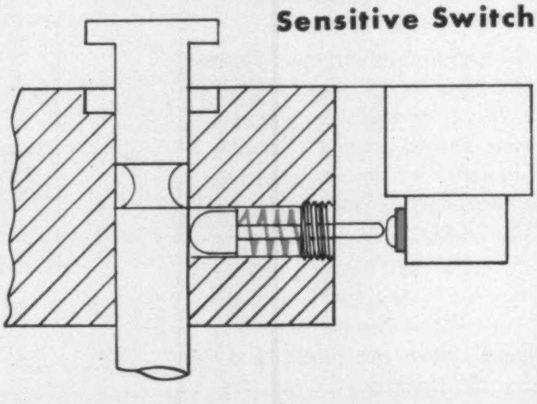
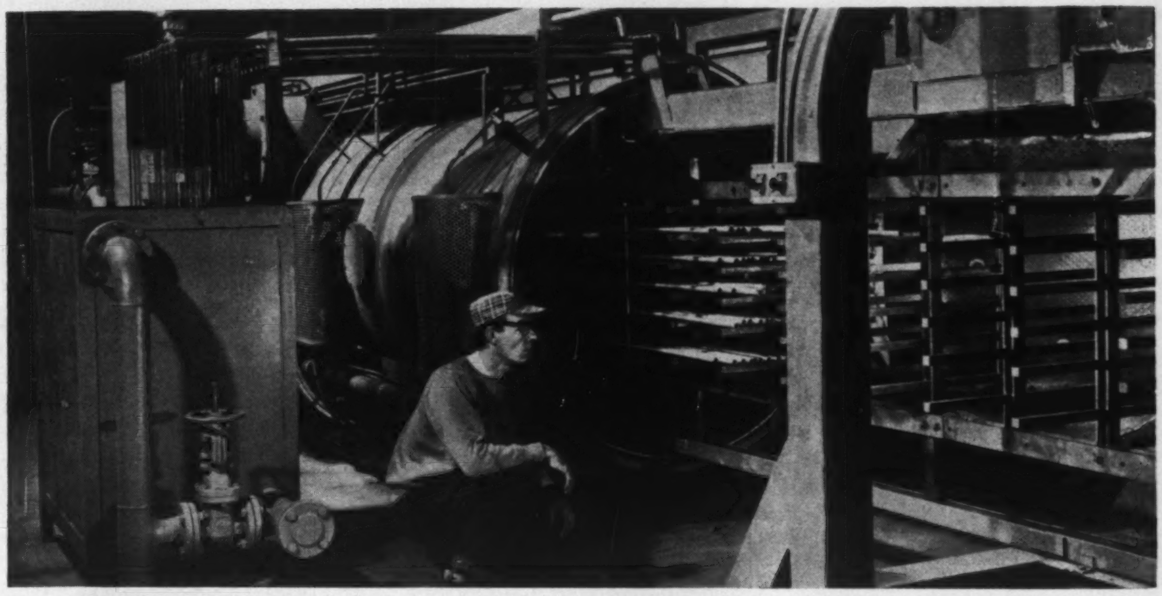
Shear Pins



10
Bending Plate

11
Sensitive Switch





TAKES LONG TUBING: New cold-wall furnace for vacuum annealing of titanium handles 35-ft long tubing. Vacuum is only 0.002 microns, thus providing a bright finish that requires no post-anneal clean-ups.

Furnace Bright Anneals Titanium

It takes a special furnace to bright anneal titanium. Temperature must be high; vacuum must be low.

A new cold-wall furnace, just put into operation, may be the answer to this vexing job.

▪ A new vacuum-anneal furnace which permits bright annealing of titanium was just put into operation. It paves the way for annealing finished parts since there's no need for post-anneal clean up.

Built by Vacuum Specialties, Co., Inc., Somerville, Mass., the furnace is claimed to be the largest vacuum-anneal furnace yet installed for mill operations. It has a hot zone of 38 ft, which enables it to handle extra-long lengths. Diameter is 36 in. Charges can go up to 3000 lb.

Key Feature—One of the key features of the furnace is that it can be heated to 1850°F. Yet, it sustains a vacuum down to 0.002 microns.

The new unit is a cold-wall furnace. It employs a water-cooled jacket which maintains room-temperature heat on the shell side of the equipment. A series of Type 304 stainless steel reflective shields eliminate standard firebrick and asbestos insulation.

Elimination of asbestos and fire brick guarantees against leakage in long-time operation and lowers the cost of original equipment, according to Vacuum Specialties.

Why Vacuum Anneal? — Vacuum annealing has been a standard titanium production operation since 1954. At that time, it was discovered that such procedures purged from the metal harmful atmospheric gases, such as hydrogen, picked up during production operations.

Until now, however, bright annealing of titanium has been extremely difficult. Why? Because furnace design has prevented use of the low pressures required, points out Vacuum Specialties. Pickling operations follow the annealing cycle. These add cost to the final product.

Expansion Program — The furnace has been installed at the Toronto, O. plant of Titanium Metals Corp. of America as part of the company's $2 million tubing expansion program.

Basic racks and run-out tables can handle tubing or bars from ½ to 3½-in. diam—in lengths up to 35 ft. Racks can be readily modified according to the product size being annealed.

Where Are Markets? — The TMCA tubing facility was initiated primarily to serve the needs of the chemical process market for titanium—expected to double in the next few years.

Currently, 300,000 lb of titanium are being supplied annually to chemical companies seeking to combat material corrosion.

TV System Monitors Inventory In Modern Steel Warehouse

Do your salesmen know what's in stock when they promise an off-the-shelf delivery?

Closed-circuit TV can bring up-to-the-minute inventory records into the sales office.

▪ Steel warehousing is a complex business. In dealing with 4000-5000 different types of metal—by conservative estimate—the problem of inventory poses a major headache.

It's a fast-moving business. Materials that are offered for sale one minute are sold a few minutes later by telephone. Often, these transactions reach across the nation.

What's Left?—Paper work has a hard time keeping pace with sales. However, the sales force must know the metal-stock status at all times.

LeVita Industries, Inc. and the Magnetic Steel & Alloy Corp., both located in Detroit, are associated steel-warehousing companies. Until recently, they went around in circles trying to post inventory changes.

Most companies just talk about inventory problems. These two companies decided to take the bull by the horns. Without professional help, they engineered and built a closed-circuit television system that provides instant visual-inventory records.

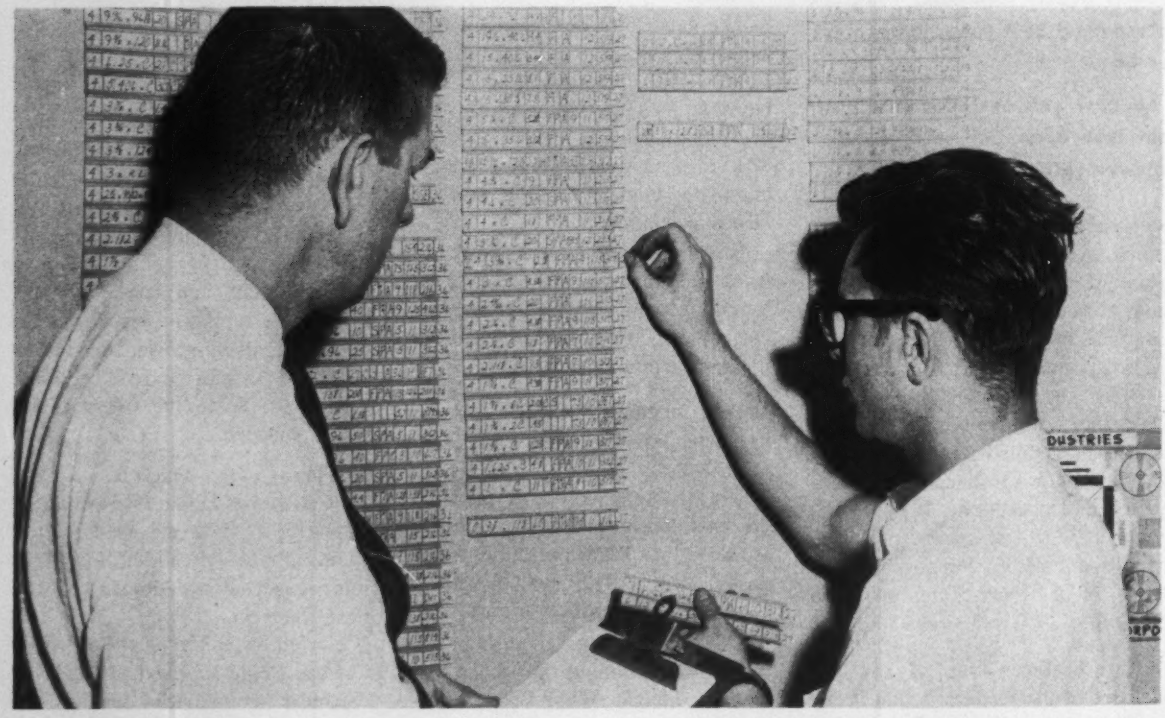
These records run into thousands of items. They include a wide range of steels in multifarious grades, shapes, sizes and conditions.

Data Logging — Previously, an index-card system was used to keep inventory records. This system couldn't cope with the fast-changing sales picture. Sometimes the office girls would just complete multiple copies of the index cards only to learn that the indexed item had already been sold.

The new TV system began with an idea of Iyler Cook, president of Magnetic Steel & Alloy Corp. Mr. Cook is an electronics buff. He had no trouble selling his idea to Julius Anscher who heads up LeVita Industries. Anscher is also vice president of Mr. Cook's company.

Along with drawing all the wiring diagrams, Cook taught the other members of the staff how to handle a soldering iron. Everyone pitched in. Now, with the bugs worked out, the two companies share an efficient TV-inventory system.

On the Board — An inventory board is located in a ground-floor



MAGNETIC HOLDERS: Vital inventory statistics are secured to a metal board by magnetic-based holders.

room. Measuring 12 x 20 ft, this board covers one wall of the room. It's made of lightweight steel. A slightly concave surface, covered with non-reflective paint, prevents the undesired bouncing of light.

On this board there are many rows of neat, vertical title holders These holders have magnetized bases that cling firmly to the steel board.

Each holder is ⅞ in. high and 6⅞ in. long. It receives a slip of paper carrying coded data on metal types, amounts available, sizes and shapes, conditions and other detailed information. Buying and selling prices and storage-area codes also appear in bold, black figures.

New Entry—As soon as new materials are available, title slips enter the "scoreboard" room. These slips are simply inserted in the holders; then the holders are stuck on the steel board.

When an item is sold, the title slip is removed just as easily and quickly. Mr. Anscher states: "This eliminates complex paper work. There's room to list 3000 items on the present board. And, there's plenty of space for expansion."

If the need arises, the inventory board can be extended to cover another wall. When this expansion is effected, another TV camera will come into play.

The present monitoring system consists of a General Precision lab camera. It's mounted on a vertical floor stand. It pans almost 360° in the horizontal plane. Tilting of the camera allows vertical coverage of the board from ceiling to floor levels. Zoom lenses move in to enlarge sections of the board.

Remote Readings—A control box is located on each salesman's desk. To pinpoint up-to-the-minute inventory data, a salesman uses this remote control to turn the camera's eye on the board. The control opens and closes the shutter iris for light control. Then, the camera automatically focuses to read the desired column.

There's no fumbling. The salesmen know the board areas. It takes just a few seconds to focus on the information wanted. At the same time, a salesman continues his telephone conversation.

With this TV system, there's no delay in a sales presentation. All inventory questions can be answered after a quick glance at the monitor-board readings.

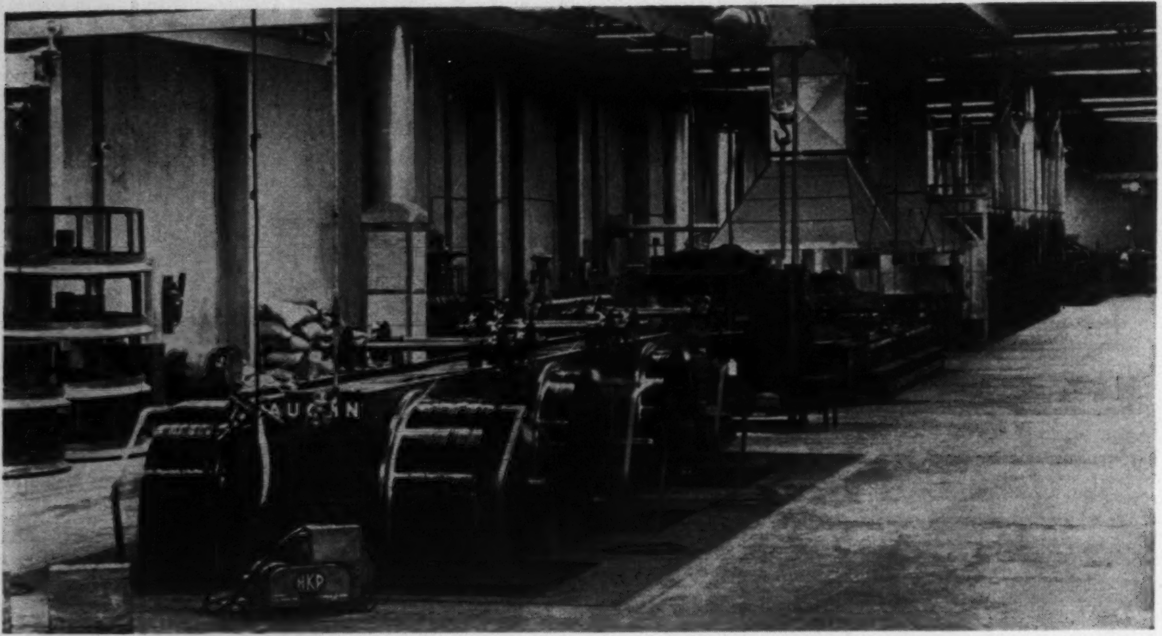
Still Growing—The control monitors in the upstairs offices look like standard TV viewers. At present, the two companies use four monitors. A second camera has been purchased to expand the system.

Mr. Cook says one camera shouldn't be tied into more than four monitors. A warning light shows when the camera is being used by a salesman. This is important. Without the indicator light, another salesman might cut in on the circuit during a sales talk.

All of the slip-in titles are prepared on perforated sheets. Preruled columns keep the coded data in fixed positions.

Payoff—"The system has been in use about four months," Mr. Anscher reports. "It's a real time-saver. And time is a commodity that's very important."

FAST ACTION: Remote control focuses TV camera to scan or pinpoint data on the inventory board.



MAKES WIRE: Line for making oil-tempered spring wire features a special hardening and coating furnace.

Single Unit Oil-Tempers Wire

A new, single unit is replacing two or more others for making a range of oil-tempered spring wire.

Key to this new installation is a special hardening and coating furnace.

▪ A unique new unit, for making oil-tempered spring wire, has been installed at The Colorado Fuel and Iron Corp.'s South San Francisco plant.

The unit is unique in that it oil tempers a range of wire sizes that normally required two or more separate units. It also represents a significant metallurgical advance.

Increase Flexibility—By providing the needed variable accuracies in atmosphere control, furnace temperature and pull-through speed, the installation increases CF&I's production flexibility.

Coils of selected high-carbon steel wire are placed on 12 free-spinning pay-off reels. They are then drawn through the atmosphere controlled furnace where the wire is hardened and coated with a controllable iron oxide.

From the furnace the wire passes through an oil quench which sets the hardening. The wire then enters a lead-drawing furnace which restores its ductility. Next, it passes through a water cooler. Finally, it runs over sheaves partially placed in an oil bath. The bath gives the wire a light oiling before it's coiled on the take-up block.

The finished wire bundles, weighing 300-600 lb., are coiled on 72 in. maximum to 16 in. minimum blocks, depending upon the wire diameter.

What's the Key—Providing the key to this unique operation is a radiant-tube atmosphere-controlled furnace. It's designed to control both atmosphere ratio and temperature. Thus, the furnace provides the correct hardening temperature and exact amount of iron oxide coating for a wide range of wire. Sizes vary from 0.625 through 0.041-in. diam.

Nitrogen, the furnace's basic atmosphere, is supplied by a generator which manufactures and dries the nitrogen. The nitrogen ratio, which determines the amount of iron oxide coating the wire receives, and the temperature of the furnace are precisely controlled and varied to compensate for different wire sizes.

In addition, the speed of the wire at it passes through the various processes is controlled by spindles.

The correct hardening temperature and the precise amount of iron oxide coating imparted to a wide range of wire sizes can be achieved with these variables.

This variable nitrogen atmosphere replaces the use of additional units with lead baths considered necessary to impart the correct amount of iron oxide coating when hardening finer sizes of wire.

At right: P/M Slitting and Coil-Banding Line in a Chicago steel warehouse service center.

At left: P/M Cut-to-Length Line in same Chicago Steel Service Center.

P/M Lines help make this Steel Warehouse a Service Center

Chicago area warehouse customers get faster service, a better product, as a result of new features built into P/M Cut-to-Length and Slitting and Banding Lines shown here. These lines incorporate special features which, developed through P/M's *productioneering* approach, fit the specific needs of steel service center operation, and increase the speed, accuracy, and economy with which these lines operate. *Productioneering*—designing and building a processing line to the particular needs of the user—makes P/M lines for warehouses simple to operate, easy to maintain, flexible to handle all warehouse requirements. We will be glad to furnish details about the advantages you can get from "productioneered" lines—just write to:

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Linde "Total Gas Technology" creates improved cutting equipment . . .

Using natural gas, OXWELD C-66 quickly slices off large riser.

CUTS COSTS BECAUSE NO CORNERS

In actual competitive tests, the new OXWELD C-66 Natural Gas Torch has saved 15% or more on operating costs compared with other cutting torches. Why? Because no short-cuts were taken in design and manufacturing. ✦ Designed for use with natural gas, propane, butane, or city gas, the C-66 can slice through 30 in. of metal *in one pass!* ✦ Because of its tremendous preheat capacity and gas flows (up to 300 cfh of natural gas and 3000 cfh of oxygen), the OXWELD C-66 starts faster and cuts quicker than any other torch on the market. ✦ You can use the C-66 for all your flame cutting . . . from thin sheet metal to the largest risers. For additional information, call or write your nearest LINDE representative.

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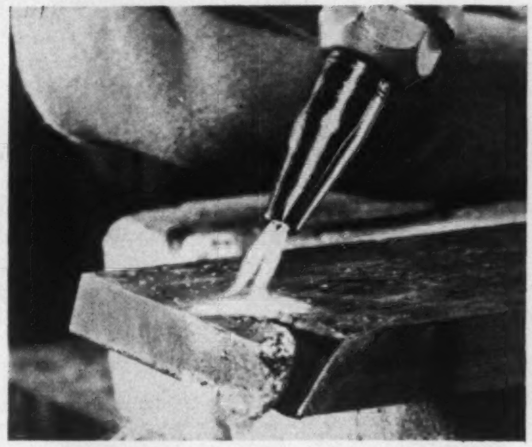
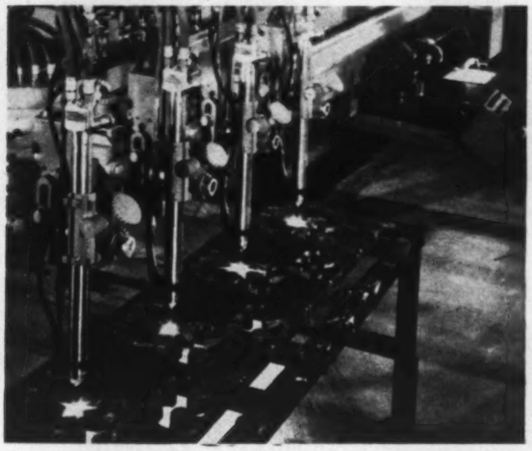


OXWELD nozzles are chrome plated to shed slag and spatter. You pay a little more but they cost you a lot less in the long run. Service life is boosted at least 150%. Mirror-like smoothness of gas passages assures stable flows and clean cuts. There is an OXWELD nozzle for every type of work . . . more than 40 different nozzles for the C-66 torch alone.

Ideal for precision machine cutting, using natural gas or propane, the new OXWELD C-67 torch incorporates all the features of the C-66. The new C-67 will cut any thickness up to 18 inches. You get faster starts and sharper, cleaner cuts that require little or no finishing. New two-piece OXWELD nozzles are available for the C-67 torch.



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NEW BOOKS

"Eisenhutte" (Iron Forge), 5th Edition, is one of the famous handbooks compiled by Hutte, an academic society in Germany. Thirty years have elapsed since publication of the 4th edition. Thus, the book is almost entirely new. More than 80 co-authors have collaborated in its preparation. It covers theory and practice of the iron and steel industry from raw materials to final product. Rolling, forging, extrusion and coating are dealt with in detail. Statistics on raws materials are international. For each process, necessary equipment is described and well illustrated. Method of operation is also explained. Of course, the metallurgy of ferrous materials and alloys is discussed in detail. Many cost data are included. Nor is foundry practice ignored. Centrifugal casting, pipe couplings and weaving of wire fences gets full coverage including illustrations. Hourly capacities associated with each process are given. Each section of the handbook is backed up by a bibliography. Since it takes 2½-3 years to publish a manuscript, the "Eisenhutte" is up to date as of 1958. Reviewed by W. Trinks, Ohiopyle, Pa. 1342 pp., 98 Dm (about $24.50), Wilhelm Ernst & Sohn, Berlin, Germany.

"P D & D Product Encyclopedia" is a compendium of more than 2400 materials, component parts, R & D equipment items, and technical brochures for the design engineer. As a reference tool, this book serves what "Product Design & Development" editors describe as the "product designer's bread and butter field." In short, the component parts. Product descriptions include material on performance, operation, dimensions, specs, properties, uses, availability and other pertinent engineering data. However, the key question with literature of this type is: "Can you **find** what you want?" The "Encyclopedia" solves this problem with a carefully thought out arrangement of material. Each chapter covers a major product classifications. In addition to this handy chapter arrangement, all product and literature items are indexed twice—by name of manufacturer, and by product description. This triple reference system makes it easy for the designer to locate any given product, or class of products, or OEM manufacturer. Of course, arranging the chapters by major product classification necessarily leads to some arbitrary editorial decisions. In general, products are classified by their end function. For example, a solenoid valve is classified under Hydraulic and Pneumatic Components because it serves a hydraulic function despite the fact that it may be actuated electrically. 253 pp., $4.00, Product Design & Development, Chestnut & 56th Sts., Philadelphia 39, Pa.

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The "BIG K"

Now, after more than four years' research, Kalamazoo brings to you the all new Model 14A — horizontal metal cutting bandsaw. Incorporating some 30 shop proven, cost saving features, this hydraulic driven, heavy duty bandsaw offers cutting capacity and ability in excess of any cut-off method, at far less tool cost per square inch of cutting.

Most important among these profit producing features are: positive control force feed; clockwise blade rotation to reduce teeth shock — increase blade life; convenient 36" machine height to reduce operator fatigue; large 14" x 24" capacity; push button control; dual movable vise jaws; adjustable blade tension.

For complete details on this amazing new machine tool, phone, write or wire your Kalamazoo representative. Facilities for test runs of your material on the "Big K" are at your disposal — at no obligation.

MACHINE TOOL DIVISION
Kalamazoo Tank & Silo Company

508 Harrison St.
Kalamazoo, Mich.

NEW PATENTS

Forms Iron-Ore Balls

Pelletizing apparatus, E. J. Schnaitter and L. R. MacLeod (assigned to Erie Mining Co.), Sept. 5, 1961. In a new balling-drum for forming iron-ore pellets or balls, buildup of loose fines on the cutter bar is avoided. Canadian 627,037.

High-Impact Alloy

Aluminum-manganese-iron alloy, J. R. Bird, G. W. Meetham and M. A. Wheeler (assigned to Rolls-Royce Ltd., Derby, England), Sept. 6, 1961. A workable bar or sheet alloy having a specific gravity lower than steel along with high impact resistance consists of 6-10 pct Al, 20-40 pct Mn, not over 0.1 pct C, and the balance essentially all Fe, with at least 14 pct more of the total alloy being Mn than Al. British 876,723.

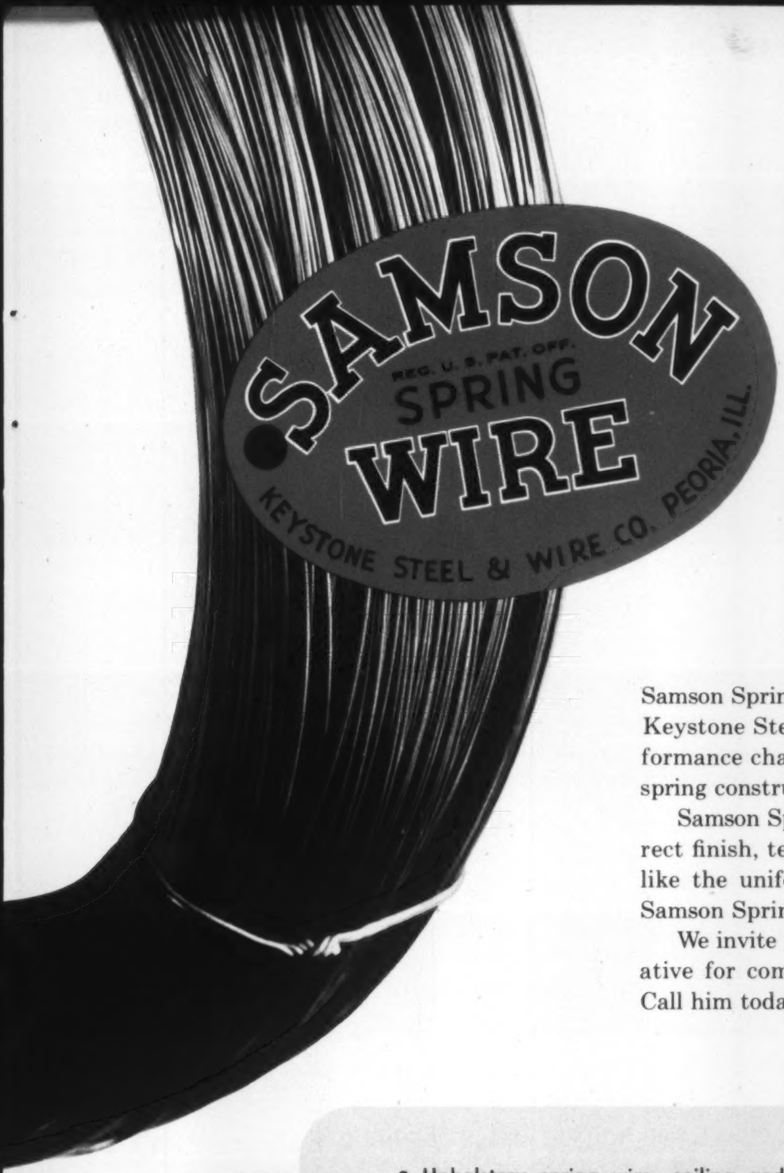
Crude-Iron Refining

Refining of crude iron, L. J. R. Lambert, W. Sedlacek and G. M. Messin (assigned to Brassert Oxygen Technik A.G., Zurich, Switzerland), Oct. 17, 1961. In a process for refining basic Bessemer crude iron containing 1.7-2.2 pct phosphorus, oxygen gas is blown onto the surface of the molten metal. This process produces steel with a phosphorus content less than 0.03 pct and a carbon content less than 0.05 pct. U. S. 3,004,847.

Iron-Ore Treatment

A method for the treatment of iron ores, Y. Nogiwa, Sept. 6, 1961. In a method for reducing iron ores, pulverized ore passes through a series of cyclones. In the cyclones, the ore is blown with hot reducing gases under controlled conditions of temperature and gas composition such that no caking occurs in the furnace. British 876,765.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.



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- Special automatic lacing wire
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- High carbon wire for borders and braces
- High carbon wire for cold rolling into border and brace sections
- Wire for severe crimping or clinching upholstery spring construction

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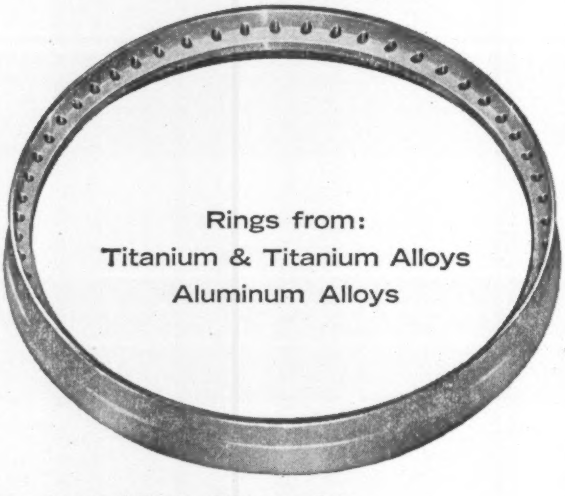
Chromoloy • 4140-4130

Rings from:
310 • 321 • 430 Stainless
Inconels
Hastelloys • 19-9DL



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Today Amweld is making flash butt-welded rings from nearly a hundred different metal alloys for over a hundred different applications. In each case the customer saves money over the cost of alternative ring making processes. He saves on metal, because Amweld forms rings from stock that is produced to or near finished dimensions. He saves on machining, because the metal is left out—not hogged out.

Amweld customers saved over one million dollars last year. By close cost evaluation of circular components and assemblies, flash welded rings were introduced enabling substantial savings. It doesn't cost you to think on paper with Amweld. Let us quote you for your cost comparison. Write today: The American Welding & Manufacturing Company, 702 Dietz Road, Warren, Ohio.

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THE AMERICAN WELDING & MANUFACTURING CO., WARREN, OHIO

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

Welding Performance

An eight-page folder containing performance reports on welding electrodes and wires is hot off the press. These reports describe how a slag processor added at least a year to the service life of clam buckets at an estimated savings of $2,210 in rebuilding costs; how consistent high-quality welds speeded production of continuous filtering equipment; and how a 16-year service record was established in the fabrication of special equipment for the chemical, paint and varnish industries. (The McKay Co.)

For free copy circle No. 1 on postcard

Plastics Price List

In a revised 64-page catalog, stock supplies and prices of plastic sheets, rods, tubes, films, blocks and flat tubings are listed. Cements, pigments and miscellaneous supplies are also itemized. (Cadillac Plastic & Chemical Co.)

For free copy circle No. 2 on postcard

Silver-Alloy Data

Two silver brazing alloys are the subjects of a new data sheet. These alloys are used primarily for brazing stainless-steel honeycomb sections. The data sheet includes info on compositions, physical properties, brazing characteristics and brazed joint properties of both alloys. (Hardy & Harman)

For free copy circle No. 3 on postcard

Pneumatic Controls

Displaying the scope of a complete line of pneumatic control-system devices, a new 23-page brochure employs color, illustrations and schematics. A convenient table of contents steers the reader to the basic product groupings. Each of these groups is presented in condensed form for easy evaluation of control capabilities. (Bellows-Valvair, a div. of International Economy Corp.)

For free copy circle No. 4 on postcard

Magnetic Starter

Here's a four-page bulletin describing a compact, size-3 magnetic starter. Complete horsepower ratings, dimensions and electro magnet data are included. The booklet also contains information on field modification kits. (Furnas Electric Co.)

For free copy circle No. 5 on postcard

Power Supply Roundup

Just released, a new 44-page catalog deals with a complete line of both standard and custom-engineered power supplies, ranging in size from 50-5000 kw. Over 3000 models are listed and described in this well-illustrated two-color offering. For a free copy, write on company letterhead to: American Rectifier Corp., 95 Lafayette St., New York, N. Y.

Fastener System

Describing a versatile fastening system, an attractive 27-page brochure presents specs and photos to illustrate various vibration-resistant fastening installations. Many types of fasteners are described. Suggestions on the use of each type are included. (Huck Mfg. Co.)

For free copy circle No. 6 on postcard

Pneumatic Timing Relay

Cutler-Hammer's new one-minute pneumatic timing relay is described in a four-page folder. The publication contains diagrams, operational features, and a contact rating chart

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. **11/30/61**

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FREE LITERATURE

on the new device. The relay operates with time periods from 0.2 seconds to one minute on such applications as machine-tool controls and sequence controls for industrial processes. (Cutler-Hammer, Inc.)

For free copy circle No. 7 on postcard

Magnetic Separators

A new, six-page brochure tells all about a complete line of permanent magnetic drum separators. These units handle the automatic separation of iron contamination from bulk materials. The illustrated literature discusses principles of magnetic drum operation and how to select correct separating units. (Eriez Mfg. Co.)

For free copy circle No. 8 on postcard

Custom Steel Parts

Complete engineering and fabricating services for the production of custom steel tools, parts and assemblies are described in a new brochure. Backed by more than a century of experience, this service is of particular value to manufacturers whose replaceable parts or assemblies must be heat treated, hardened, tempered, and ground. (Disston Div., H. K. Porter Co., Inc.)

For free copy circle No. 9 on postcard

Precision Motors

Eicor Div. of Indiana General Corp. brings you up-to-date on its latest designs with a new catalog describing 25 precision motors. Complete specifications for each unit such as input and output voltage, design standards, size and weight, insulation, etc., are included.

For free copy circle No. 10 on postcard

Flowmeter Data

A new 2-in. high-pressure flowmeter, designed for both liquid and gas applications, is the subject of a new catalog sheet. Design and construction features, connections and dimensions, pressure-drop charts, and ordering information are all included. (Rotron Mfg. Co.)

For free copy circle No. 11 on postcard

Lubricating Oils

Improvements in a line of multipurpose lubricating oils, as a result of an advanced refining process, are described in a new brochure. The oils are available in different viscosities to meet various service conditions. (Gulf Oil Corp.)

For free copy circle No. 12 on postcard

Urges Protection

When did you last calculate the effect of corrosion and product contamination on the profit squeeze of your company? Here's a four-page brochure with some vital facts on ways to prevent these needless losses. Applied protective coatings and linings are the suggested solutions. (Metalweld, Inc.)

For free copy circle No. 13 on postcard

All About Vane Pumps

The use and operating characteristics of vane pumps at pressures up to 2500 psi are the topics covered in a new engineering booklet. It discusses one company's vane pumps and the variety of their possible applications in hydraulic circuits. Included are fully documented performance and efficiency charts and schematic diagrams. (Denison Engineering Div., American Brake Shoe Co.)

For free copy circle No. 14 on postcard

Catalogs Cutting Tools

More than 30,000 items are contained in a new cutting tool catalog. This comprehensive hard-bound volume lists a complete line of cutting tools, inspection equipment, abrasives, cutting fluids, tool and die steels, and machine tools. Much helpful reference material is also included. (The DoAll Co.)

For free copy circle No. 15 on postcard

Galvanic Protection

Aluminum anodes that protect ships from galvanic corrosion are the topic of a new brochure. This publication compares electrochemical properties of the aluminum alloy with those of other anode metals. Suggested applications and present uses are also included. (Reynolds Metals Co.)

For free copy circle No. 16 on postcard

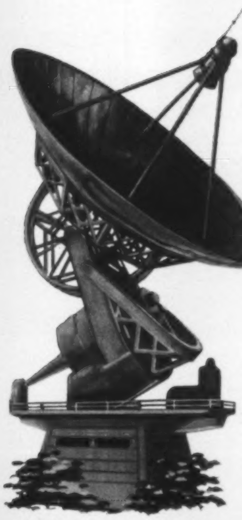
Oil-Tight Pushbuttons

Oil-tight flush pushbuttons are the subject of an eight-page booklet which serves as a guide to control where liquids present a problem. The free literature describes the equipment available for flush and surface mounting in standard or custom control stations. (Westinghouse Electric Corp.)

For free copy circle No. 17 on postcard

STEELMAKING AT JESSOP

Survival? It could depend on a 3,000-mile picket fence



Ever-vigilant sentinels against surprise attack are the radar installations along the DEW Line. Stretching 3,000 miles across Canada and Alaska, this electronic fence is our first line of defense.

At bleak, lonely outposts Air Force and civilian technicians watch for tell-tale blips on radarscopes—Distant Early Warning of the possible approach of enemy aircraft or missiles.

This all-weather system must withstand the worst of the elements—sub-zero temperatures, high velocity winds, rain, snow and ice storms common to the Far North. And dependability of the equipment could determine whether or not we survive an attack.

There are numerous applications for specialty steels made by Jessop Steel Company in DEW Line installations. For example, forging quality alloys and wear-resistant tool steels for the gear mechanism of a rotating surveillance radar; cast-to-shape steel for certain other component parts and precision ground steels for delicate instrumentation.

Jessop is keenly aware of the importance of built-in dependability in the steelmaking process—whether meeting specifications for steel to be used in the nuclear reactor of a Polaris-firing submarine; a Redstone missile to launch an astronaut; an earth-girdling satellite; or a DEW Line radar installation.

Yes, for dependability, you can rely on Jessop . . . the *big* name in specialty steel.

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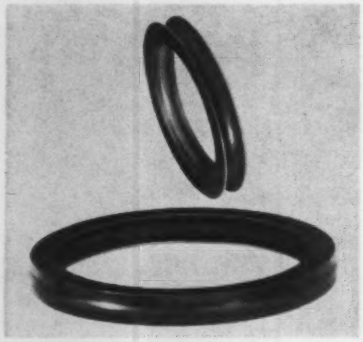
JESSOP

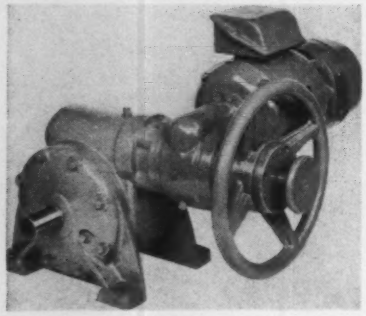
New Materials and Components



Air-Cylinder Seal Needs No Mechanical Assist

Here's a new component that offers unusual flexibility to air-cylinder designers. Designed around a definite arch with integral legs or sides, this new sealing ring provides its own compression and expansion. In other words, you need no mechanical assist to actuate the sealing action. In service, one "leg" of the sealing ring is instantly triggered by the air-pressure source. It provides positive sidewall sealing as the air medium flows around the non-contacting leg and backfills the hollow arch. This causes expansion of the sealing ring face against the shaft or against the cylinder wall. Reversing the pressure merely reverses the action. Either way, the new sealing ring reacts instantly. (International Packings Corp.)

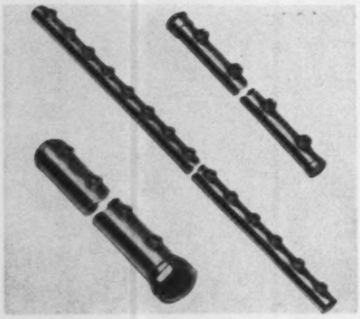
For more data circle No. 25 on postcard, p. 157



Rotary Actuator Features Improved Shifting

More convenience and safety highlight the motor-to-manual shifting mechanism of a new heavy-duty rotary actuator. This newcomer is designed for use with valves, dampers, and similar industrial flow-control devices. It boasts a two-stage, worm-gear, speed-reducing drive which provides positive control of spline alignment and engagement. During motor-to-manual shifting, alternate splines are placed along the engaging shaft. Thus, the output shaft can be turned by a large handwheel, or by the motor. Formerly, it was necessary to position the output shaft manually. Spline engagement was often difficult. (Electra Motors, Inc.)

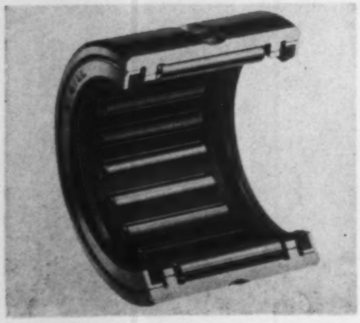
For more data circle No. 26 on postcard, p. 157



Manifold Sections Speed Gas-Header Assembly

Ready-to-use manifold sections are now a reality. Ideal for constructing air, gas or liquid headers, these convenient sections come in stock lengths of 48 in., one or two inches in diameter. Each section has a series of brazed-in taps whose centers are spaced either 2- or 3-in. apart. The taps are brass, ⅛ or ¼ in. NPT. The manifold section itself is made of copper tubing. Sections may be joined by couplings or unions to construct longer manifolds. These assembled sections are good for service with up to 200-psi working pressures. Savings of up to 50 pct are possible compared with on-the-job fabrication of heavy-wall pipe. (Dynak Inc.)

For more data circle No. 27 on postcard, p. 157



Cage-Type Roller Bearings Boast Integral Seals

Pre-lubricated, integral seals avoid the extra bearing width needed for auxiliary seals, in a new series of cage-type roller bearings. The seals protect inner components from contamination. They also retain their lubricant. Thus, there's less need for maintenance involving relubrication. According to the manufacturer, retainer-ring design controls roller alignment under speed and shaft misalignment conditions that are far beyond the capabilities of ordinary, end-guided, needle roller bearings. Available from stock in shaft sizes from 0.625 in., the new caged bearings are dimensionally interchangeable with needle roller bearings. (McGill Mfg. Co.)

For more data circle No. 28 on postcard, p. 157

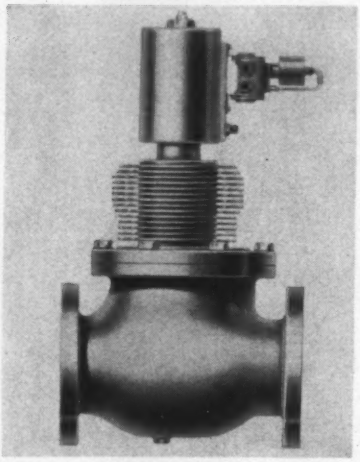
Does Triple Duty

This multi-purpose inner bushing is now standard piston-rod seal design on a line of hydraulic cylinders. The metallic inner bushing most efficiently replaces the support washer that held the wave spring and pressure ring in contact with the lip of the rod seal. The new bushing prevents dynamic leakage and compensates for wear. But that's not all. The inner bushing has two other important functions. It seals off the rod-seal chamber from sudden suction shock loads that might adversely affect sealing characteristics. And it holds the piston rod in an exact central position for ease in disassembly and re-assembly of the rod seal parts. (Miller Fluid Power Div., Flick-Reedy Corp.)

For more data circle No. 29 on postcard, p. 157

Gas Valve

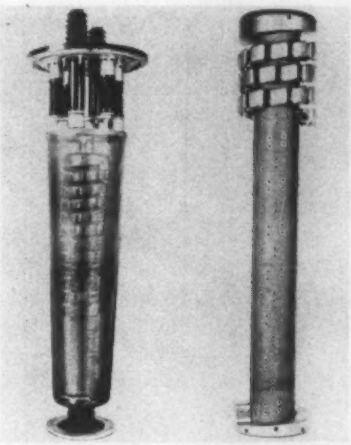
Equipped with a piston-type actuator, a new gas valve can be used for remote programming in either open- or closed-cycle modes. Normalizing fins permit cryogenic applications or industrial uses over a wide temperature range. Each valve insures precise control at temperatures from —350° to 800°F. (Security Valve Co.)



For more data circle No. 30 on postcard, p. 157

Modular Rectifier

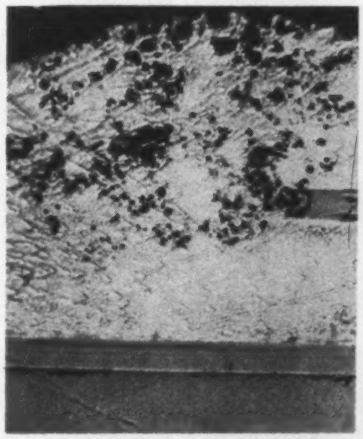
Glass-epoxy tubing plays a key role in a new rectifier design. This tubing becomes a central insulating cylinder in a silicon-rectifier power pack. A large number of modular silicon rectifiers, connected in series, are attached to the tubing. One use for the new rectifier unit centers on the power-beam supply in a klystron that will furnish 30,000 v at 9 amp dc. The complete rectifier unit consists of 176 silicon-rectifier modules, bolt-assembled in a helix around a glass-epoxy, laminated-plastic insulator tube. (Taylor Fibre Co.)



For more data circle No. 31 on postcard, p. 157

Gold-Boron Alloy

The production of a new high-purity, gold-boron alloy will come as good news to PNP-silicon transistor manufacturers. This type of alloy is indispensible for successful transistor fabrication. The alloy is used to insure P plus ohmic contact on the collector region to overcome negative impedance characteristics of the higher current levels. The alloy consists of both boron in solid solution in the gold, and extremely fine-grained boron particles homogene-



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Electric furnace operators report that GUNDOL, GUNMIX and GUNMAG for routine maintenance of sidewalls doubles lining life and, in many cases, cuts refractory costs in half. Shooting open hearth frontwalls, backwalls and skewbacks with GUNCHROME-M produces similar savings.

If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

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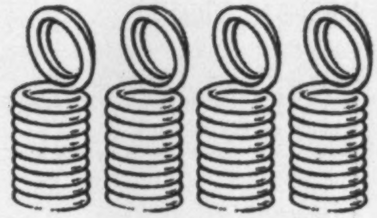
The Porter Alloyist delivers the right alloy IN THE SPOTS THAT COUNT



In a split second, the parachute will leap from the pack, released by five special stainless steel springs. Can you think of a tougher spot for reliable performance? Now—and every other time—the springs must work *perfectly*, must keep their shape, unfailing strength and resistance to low temperatures. It's a job for exactly the *right alloy*—recommended and supplied by the Porter Alloyist.

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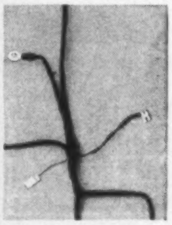
Ask for a free copy of "Alloys for Industry" describing our wide range of specialty alloys. Write H. K. Porter Company, Inc., Riverside-Alloy Metal Division, Riverside, N. J. Or contact our sales offices in Hartford, Chicago, East Orange, Atlanta, Cleveland, Detroit, Cincinnati, Los Angeles and Rochester.



PORTER cupro nickel wire carries the workload in telephone switchboards.

PORTER supplies bronze and brass strip for wiring harnesses in automotive and marine electrical systems.

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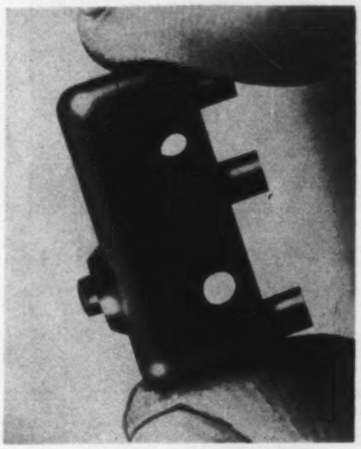
RIVERSIDE-ALLOY METAL DIVISION
H. K. PORTER COMPANY, INC.

ously disbursed in the gold matrix. Foil as thin as 0.0005 in. can now be produced. Furthermore, the alloy can be clad down to 2/10 mil on a suitable substrate, and a wire of only 0.0015-in. diam. can also be manufactured. This type of wire is beginning to find favor with some manufacturers for use in fabricating gold-bonded silicon diodes. (Alloys Unlimited, Inc.)

For more data circle No. 32 on postcard, p. 157

Miniature Switch

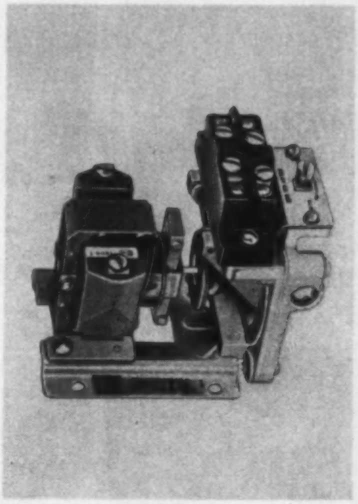
Designed to carry a high current load of 10 amp, a precision miniature switch serves in low resistance applications. Rated life of this switch is more than 1-million cycles. Temperature range is —100° to 250°F. A high contact force makes the switch safe from contact bounce, contact chatter, shock, vibration and dead break. (U. S. Switch Corp.)



For more data circle No. 33 on postcard, p. 157

One-Minute Relay

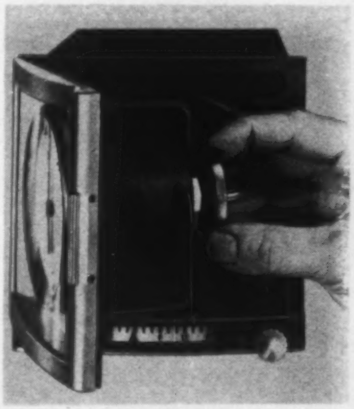
An unusual one-minute pneumatic timing relay sets high operating standards when used as a machine tool and sequence control. Simplicity is the keynote of this design. It features a diaphragm assembly that eliminates the need for an exhaust valve. This lets the timer maintain accuracy and reliability even in the dustiest environments. Since its diaphragm is made of silicone rubber, the timer will operate dependably in temperatuures as high as 150°F, or as low as —45°F. Positive and accurate time adjustments can be made over a range of 0.2-60 seconds. Other features include easy conversion from "on delay" to "off delay," a molded magnet coil, and a precision unit switch which is suitable for pilot- and control-circuit duty with up to 600 v. (Cutler-Hammer)



For more data circle No. 34 on postcard, p. 157

Indicating Control

A new miniature indicating control station is available with either conventional or scanning-type gage. The scanning gage permits vertical positioning of set point regardless of actual set point value. An operator can thereby easily scan a large number of instruments whose indicators all should be pointing to "12 o'clock." The instruments operate from a standard 3-15 psig input to a Bourdon tube or Ni-Span C diaphragm-type actuating element. Ac-



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Components and weldments of all types . . . tanks, bases, covers, guards . . . are quickly and accurately fabricated by Kirk & Blum craftsmen.

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Send your prints for prompt quotation.

50 YEARS OF SERVICE

KIRK & BLUM

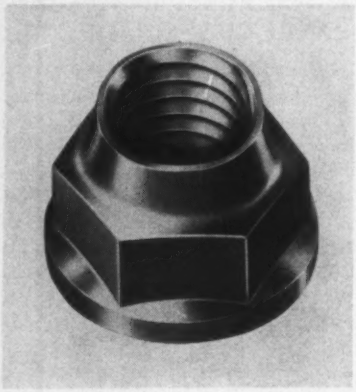
THE KIRK & BLUM MANUFACTURING CO., 3200 FORRER ST., CINCINNATI 9, OHIO

curacy of the Bourdon tube is ±0.35%; sensitivity is 0.25%. (Fisher & Porter Co.)

For more data circle No. 35 on postcard, p. 157

Locknut

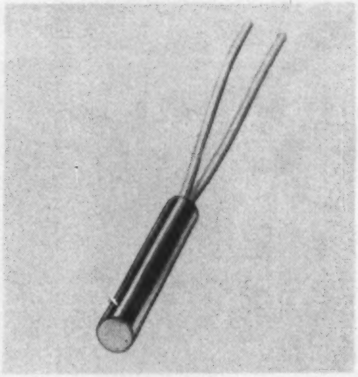
One-piece and all-metal, a new "commercial" locknut of the prevailing-torque type comes in a wide range of sizes. Those currently offered range from #10 through ½ in. with UNC and UNF threads. Other sizes will be available soon. The new locknut is made from heat-treated alloy steel. This gives high strength without bulk, and enough elasticity for repeated reuse without impairment of the locking action. Locking is effected by a slight deformation of the top threads into elliptical shape. As the nut is assembled, the out-of-round threads tend to conform to the circular pattern of the mating threads. Friction on the flanks of the nut threads creates a positive, powerful locking grip. Other advantages include Class 38 threads, temperatuure resistance to 550°F., conformance with military specs, tensile strength in excess of 250,000 psi, and a built-in flange which saves washer cost, speeds assembly and reduces indentation. (Allen Mfg. Co.)



For more data circle No. 36 on postcard, p. 157

Probe Thermostats

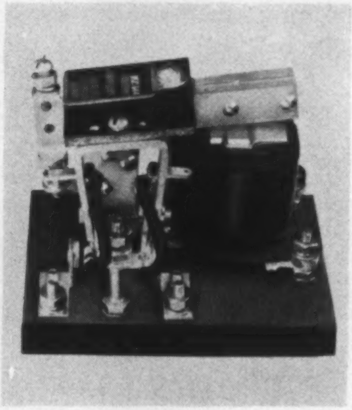
A new, fast-acting, probe-type thermal switch has been introduced for fixed heat control and safety limit applications. In this precision bi-metal unit (#4100-1), a positive switching action results from the expansion of the outer jacket axially away from the non-expanding inner metal. Every unit is factory preset and tested, providing maximum dependability for critical applications, such as aircraft, missile and other precision requirements. (Thermel, Inc.)



For more data circle No. 37 on postcard, p. 157

Special-Purpose Relays

Four new 30 amp relays and contactors for non-inductive loads are available. Ideally suited for use in electric heating and lighting, they feature quiet operation, wiping contacts, laminated frame operators and high contact pressure. They are contact rated at 30 amp, 250 v ac and may be applied continuously up to their full rating, open or enclosed, with conservative temperature rises. (Automatic Switch Co.)



For more data circle No. 38 on postcard, p. 157

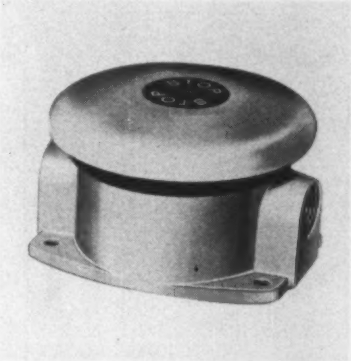
Spur-Gear Racks

To meet the increased demand for high-precision racks, these “certified” spur-gear racks are manufactured from 416 stainless steel under controlled stress-relieving procedures before final cutting. Rack dimensions are certified at final inspection and a complete inspection report is supplied with every rack. Shelf-life or temperature variations have very little distorting effect on the new racks. They're available in three precision classifications with a wide range of pitch sizes. (PIC Design Corp.)

For more data circle No. 39 on postcard, p. 157

Find Switches Quickly

A bright orange, 5-in. diam operating button is ideally suited for use as an emergency stop station or a multi-switch starting station. The button provides the cover for the Type D switches and it is secured to the enclosure by the nameplate screw located in the center of the button. Removal of the nameplate screw and operating button provides easy access to the precision unit switch terminals. The switches are mounted with the terminals up for good wiring accessibility. The switches are available with one or two precision unit switches providing a 1NO-1NC or 2NO-2NC contact system. (Cutler-Hammer.)



For more data circle No. 40 on postcard, p. 157

Power-Line Coupler

Here's a line coupler which permits safe and easy removal of circuit breaker and starter equipment. The line coupler makes it unnecessary to disconnect the main power feeder to remove a unit. The branch connectors are fully insulated for complete safety to personnel. Hot

Capacability
means

Convenience

When it comes to ramming refractories, *convenience* is Basic. And, it pays to let Basic's magnesia ramming refractories, RAMSET and RAMICLASE, be your “ace in the hole” when schedules are tight. For quick, dependable bottom installations, they can't be beat.

In the 20 years since their introduction, RAMSET and RAMICLASE have become the standard of comparison for open hearth and electric furnace bottoms. For the best possible job, Basic furnishes special mixers, conveyors, rammers and other equipment to speed installation and reduce labor costs.

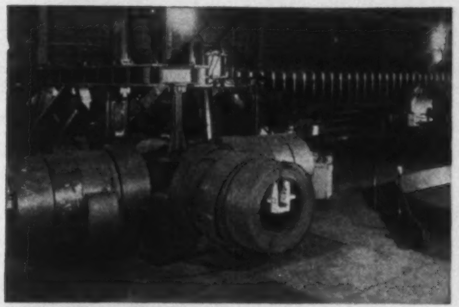
If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

BASIC INCORPORATED
845 HANNA BUILDING
CLEVELAND 15, OHIO

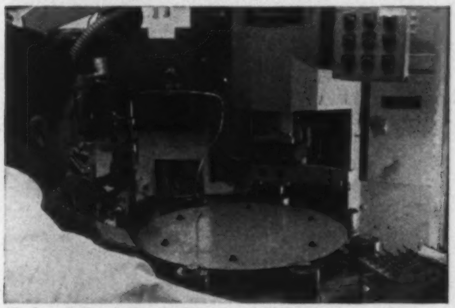
Warco
PRESS

◀ **Warco Press Line** composed of three 400-ton straight side, eccentric gear presses forms automobile wheel "spiders" at The Budd Company's Detroit plant. Here, William F. Longfield, manager of press engineering and sales for McKay's Federal-Warco Division, looks over a finished wheel with Edwin Seiberlich, works manager, and R. O. Greenshields, plant manager.

Photo by ARNOLD NEWMAN



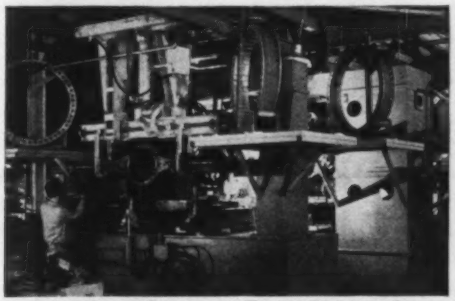
McKay Tube Mill Feed Line sends steel to the tube mill continuously at a rate of 1,800 fpm at U. S. Steel's National Tube plant at Lorain, Ohio.



Federal Dial Feed Projection Welder, one of several used by the Bendix Corporation to weld transistor assemblies. It will weld 2,000 assemblies per hour with exacting precision.

Uncoiling, flexing, processing, slitting, shearing, feeding, forming, stamping, and welding . . . keeping ***metal in motion*** in the most economical manner possible, from coil to finished product, ***is the business of McKay Machine.***

McKay Machine, its divisions and subsidiaries produce the widest range of metal preparation, processing, forming and welding equipment available anywhere. Because of this they can design and build complete, integrated production lines of perfectly mated machinery. This makes it possible to achieve compactness and bring about efficiencies not otherwise practical. It also means the manufacturer is concerned with only a single source of responsibility and supply. That's why more and more cost-conscious metalworking firms are making it a point to know *The McKay Machine Company, Youngstown 1, Ohio.*



Berkeley-Davis Automatic Fusion Welding Lines, such as this one of two recently installed at American Metal Products Company in Detroit for the automatic production of over 200 sizes of motor vehicle axle housings, lead the industry in precision operation, production efficiency, and flexibility.

beautiful
products
CONTINENTAL
STEEL CORPORATION

from
CONTINENTAL® WIRE

EXAMPLE
FIREPLACE
CURTAIN
SCREEN
WIRE

The beauty and smooth operation of fireplace curtain screens depend on accurate forming, even spacing, and neat appearance of the mesh. The wire used must be of correct temper, diameter and finish. Uniformity of these properties is of prime importance. Leading fireplace equipment makers choose Continental Wire because it possesses these features dependably, in coil after coil. The ability to take intricate forming is an important reason why Continental Wire is specified for scores and scores of other products made with wire. Continental Curtain Screen wire, 19 gauge through 20 gauge inclusive in size, is available in 500 pound to 650 pound catchweight single length coils packed in Leverpac Drums for faster weaving with less down time, cleaner handling and better storage. For wire in practically any size, finish, temper or analysis, in low or medium low carbon steels, see Continental first!

Fine Finishes in Manufacturers' Wire
CONTINENTAL STEEL
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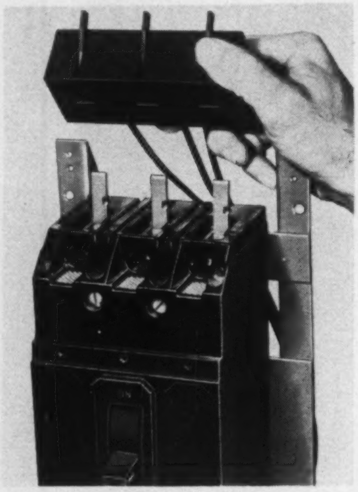
PRODUCERS OF: Manufacturers' Wire in many sizes, tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright and special shaped wire. Also Welded Wire Reinforcing Fabric Nails, Continental Chain Link Fence, and other products.

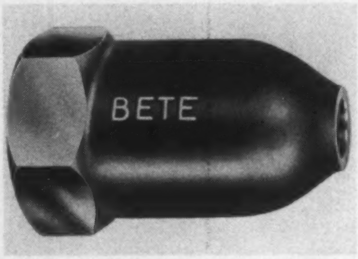
lines cannot come into contact with any part of the enclosure. The line coupler mounts on a standard circuit breaker using stabs which are installed in the line terminals. The unit is in production with a 50-amp rating, and is designed to withstand the same fault currents as the F frame circuit breaker. (Square D Co.)



For more data circle No. 41 on postcard, p. 157

Cone Nozzles

A new series of non-clogging full cone nozzles called the NC series is recommended by the manufacturer for cooling towers and ponds, quenching, aerating, chemical processing and wherever high capacity center jet nozzles are presently used. The new NC series nozzles are available in sizes from 1 to 8 in. female pipe thread, with capacities from 10 to 3000 gpm. Spray patterns are uniform full cones of 50 to 90°. Standard materials are bronze and cast iron, other materials special order. (Bete Fog Nozzles, Inc.)



For more data circle No. 42 on postcard, p. 157

Multi-Strand, High-Speed Rod Mill

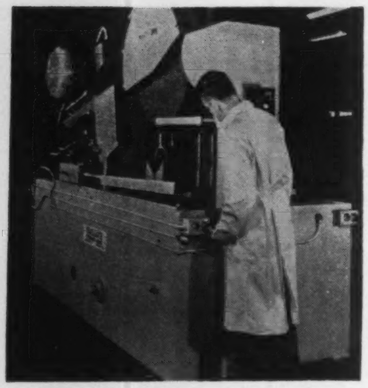
BLAW-KNOX ROD MILLS

Blaw-Knox designs and builds a full range of multi-strand, high-speed rod mills and merchant bar mills. Other Blaw-Knox equipment for the metals industry includes: Complete rolling mill installations and auxiliary equipment for ferrous and non-ferrous metals • Sheet and strip processing equipment • Electrolytic tinning, annealing and galvanizing lines • Seamless pipe and tube mills • Draw benches and cold draw equipment • Blaw-Knox Medart cold finishing equipment • Iron, alloy iron and steel rolls • Carbon and alloy steel castings • Fabricated steel plate or cast-weld design weldments • Steel plant equipment • Heat and corrosion resisting alloy castings • Blaw-Knox Company, Foundry and Mill Machinery Division, Blaw-Knox Building, 300 Sixth Avenue, Pittsburgh 22, Pennsylvania.

BLAW-KNOX

Blaw-Knox designs and manufactures for America's growth industries: METALS: Rolling Mills • Steel Processing Lines • Rolls • Castings • Open Hearth Specialties • PROCESSING: Process Design, Engineering and Plant Construction Services • Process Equipment and Pressure Piping • CONSTRUCTION: Concrete and Bituminous Paving Machines • Concrete Batching Plants and Forms • Gratings • AEROSPACE: Fixed and Steerable Antennas • Radio Telescopes • Towers and Special Structures • POWER: Power Plant Specialties and Valves

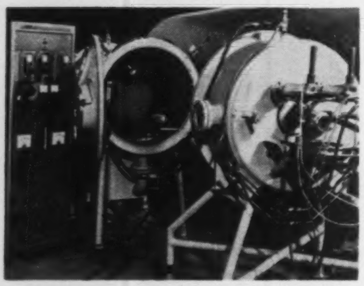
New Equipment and Machinery



Abrasive Machine Cuts 12-in. Thick Solid Steel

Here's a new abrasive cutting machine that can cut either round or square solids made from any 12-in. thick steel or alloy now on the market. Key to this performance can be found in the unit's oscillating action. Range of oscillation varies from 0-18 in. Frequency is infinitely variable. Of course, this type of cutting takes plenty of power. And the newcomer's got it. The cutting wheel has 40 hp available. Power takeoff comes through a V-belt drive from a totally-enclosed motor. The spindle is hardened and ground on all surfaces. The coolant system is self contained. Coolant flows to the work through special hollowed-out work holding bars at a rate in excess of 45 gpm. In operation, the machine produces a microinch finish on both cut faces. (Wallace Supplies Mfg. Co.)

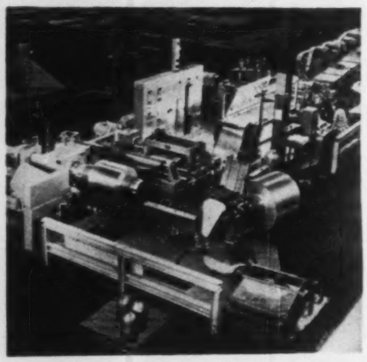
For more data circle No. 60 on postcard, p. 157



Atmosphere Chamber Also Suits Hyperthermal Use

For continuous spray-gun operation, a new controlled-atmosphere chamber is provided with single- or double-wall construction. Fully evacuable down to 50-100 microns, the 48-in. chamber has an ID of 30 in. Valve action maintains a positive pressure equal to 1-2 in. of water inside the tank. Thorough evacuation insures that the inside of the chamber and all mounted components are fully out-gassed and purged of oxygen. Also, conversion to hyperthermal use is a simple matter. (Plasmadyne Corp.)

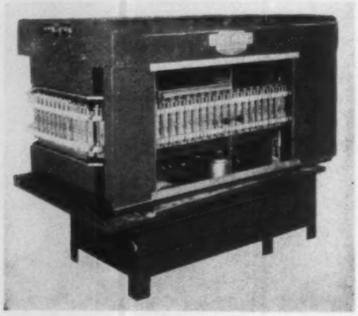
For more data circle No. 61 on postcard, p. 157



New Line Processes Aluminum Strip at 600 fpm

This new high-speed processing-line shears, classifies and thin-gage aluminum can stock at speeds nearly twice as fast as conventional cut-up and piling lines. Up till now, the top speed was 350 fpm. Classification was a separate operation. The new line performs all three steps in a single continuous operation at speeds up to 600 fpm. It handles strip as wide as 42 in. in coils weighing as much as 10,000 lb. Actual steps performed include levelling the strip, shearing it into sheets, automatic inspection of the sheared sheets for variations in thickness, and classifying the inspected sheets. Imperfect sheets slide down a chute to a reject bin before they reach the piler. (E. W. Bliss Co., Heavy Equipment Div.)

For more data circle No. 62 on postcard, p. 157



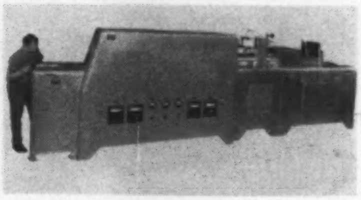
New Machine Brazes 1800 Cams Every Minute

Completely automatic and incredibly fast, a new brazing machine turns out star cam assemblies for automotive distributers at a rate of 1800 per minute. Yet it occupies an area little more than 4 x 6 ft. In the heating zone, the work coil focuses heat directly on the assembly's joint area. This prevents discoloration of a finished shaft directly below the cam. Power for the work coil comes from a 25-kw generator. After leaving the heating zone, brazed parts begin their cooling cycle. Next, flux is literally exploded off the joints by fine water spray which turns to steam on contact with the hot cams. (Induction Heating Corp.)

For more data circle No. 63 on postcard, p. 157

"No-Muffle" Furnace

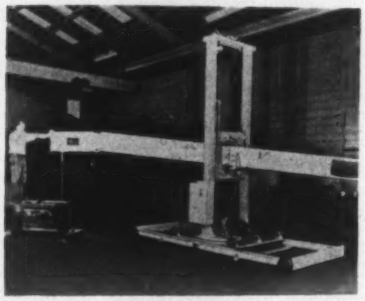
Principal design innovation of this new 2350°F furnace is its "no-muffle" construction—made possible by the use of high-purity refractory materials plus heating elements which operate without deterioration in nitrogen, dissociated ammonia, or endothermic atmospheres. Calculating refractory thermal inertia against thermal efficiency led to a design with well-balanced operating characteristics. The new open-chamber furnace has the ability to heat up to temperature rapidly without excessive loss of power. By minimizing refractory mass, the furnace is also able to stabilize very quickly at the low atmosphere dew points required to produce bright hardened work. The newcomer also incorporates work-handling devices together with mechanical and atmosphere curtains to restrict air infiltration into the heating zone. Workpieces come out of furnace bright and clean, ready for tempering without secondary grinding or finishing. (C. I. Hayes, Inc.)



For more data circle No. 63 on postcard, p. 157

Reams Low-Cost Holes

A new, portable, bridge-reaming and drilling machine has been developed to ream holes in structural-steel assemblies at minimum cost. It utilizes a gimbel-mounted, counterweighted boom that can be raised and lowered on vertical rails. These rails are, in turn, attached to a swiveled roller carriage. The reamer drive spindle is mounted in the end of the boom in a swivel unit. Motion is controlled through a roller-chain drive to a fixed sprocket at the boom pivot point. Thus, the reamer spindle remains in a vertical position as the reamer is fed through the work. The roller carriage provides the necessary free back-and-forth movement to allow for the arc motion of the end of the boom during reaming. It also provides sufficient travel motion to cover the area of a complete bridge joint. To ream holes in a structural assembly, the reaming machine is either picked up by a crane or rolled to a convenient position on the assembly floor. Four jackscrews in the base are lowered to lift the unit from its wheels and put it in a fixed floor location, ready for operation. (Walter P. Hill, Inc.)



For more data circle No. 64 on postcard, p. 157

Speeds Tool Changes

According to the manufacturer, this tape-controlled tool changer will speed-up all drilling and tapping jobs by making very-fast tool changes automatically. This frees the drilling-machine operator for other pressing work. Now, tool changes can be made in 5 seconds. In addition to very-rapid operation, the unit features a high degree of versatility. It carries up to nine-different cutting tools which can be manually selected during setup. Once tools are selected, they're fitted with adapters and seated in individual storage positions in the rotating matrix. From that point on the tape control takes over, making tool changes and directing the complete drilling operation. (Edlund Machinery Co.)

For more data circle No. 65 on postcard, p. 157

Automatic Band Saws

Two new completely-automatic band saws feature total integration of the material feed with the cutting unit. Both use a new automatic bar-feed unit backed up by a recently-introduced special saw. This bar feed is hydraulically controlled and

Capacability means Dependability

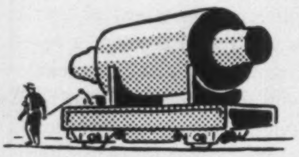
When it comes to furnace maintenance refractories, *dependability* is Basic. You won't need the "Alpine Rescue Squad" if you rely on Basic's dead-burned dolomites, MAGNEFER and SYNDOLAG. For more than 40 years steelmakers have known these products as the standard of comparison for heat-to-heat furnace repair.

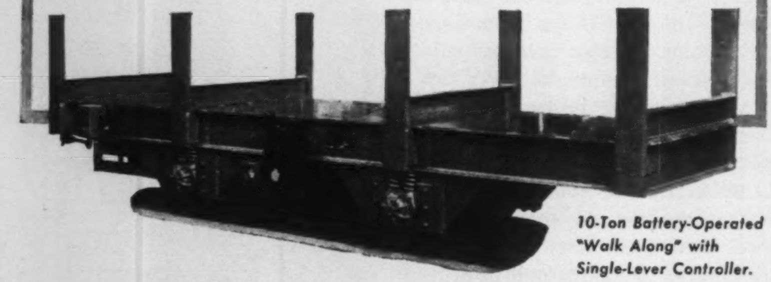
MAGNEFER and SYNDOLAG provide better bonding, greater density and higher heat resistance. Used in virtually every open hearth and electric steelmaking shop in the country, MAGNEFER and SYNDOLAG give you more advantages, more for each of your refractory dollars.

If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

BASIC
INCORPORATED
845 HANNA BUILDING
CLEVELAND 15, OHIO

Safety-type Transfers

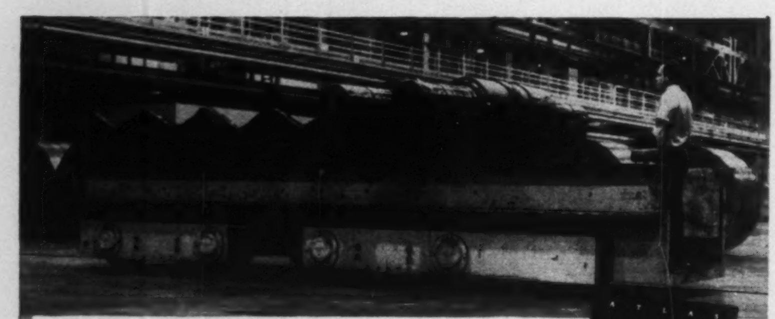




10-Ton Battery-Operated "Walk Along" with Single-Lever Controller.

ATLAS "walk-alongs" handle your big loads with BIG savings

Altas Safety-Type Transfers are custom designed in any capacity, with single or double-end platforms or for popular "walk-along" service. Safe because there is only one control lever and the car moves only when the operator holds lever.



Battery Operated Roll Transfer Car

ATLAS
WALK-ALONG SAFETY TYPE
and other power operated
FLAT CARS

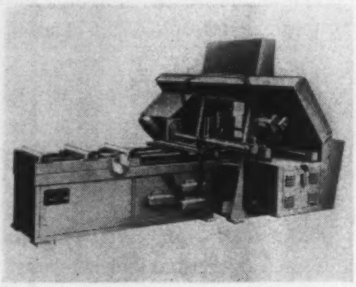
SPECIAL FEATURES . . . Deck and cradle arrangements designed for load-handling convenience. Optional power includes Storage Battery • Gas-Electric • Diesel-Electric • Cable Reel AC • Cable Reel DC • Cable Reel AC with fluid coupling • also remote control with no trailing cable.

Request Bulletin 1283

ATLAS CAR & MFG. COMPANY

1140 IVANHOE ROAD
CLEVELAND 10, OHIO

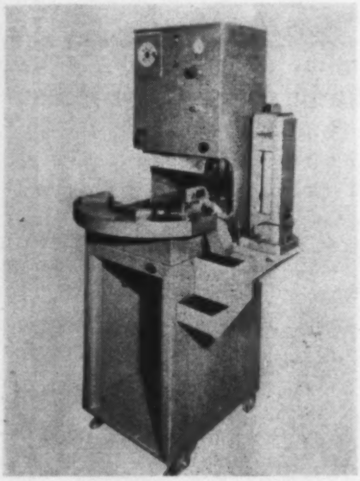
completely self-contained, with no further electrical or hydraulic equipment required. It will completely cut an entire bar without re-setting. There's only a short piece left in the work-holding vise. Setup time has been virtually eliminated, according to the manufacturer. The operator simply dials the desired length, places the material to be cut in the vises, and positions it for the trim cut. When the machine is switched to "automatic," it will continuously re-cycle, cutting the bar into preset production lengths. (W. F. Wells & Sons)



For more data circle No. 66 on postcard, p. 157

Semi-Automatic Press

This new semi-automatic machine consists of a 1-ton air press with a 24-station, rotary index table. All controls are conveniently mounted on a front panel with a special "Panic Stop" button for safety. After the machine starts up, all the operator has to do is load parts from the loading tray. Parts automatical-

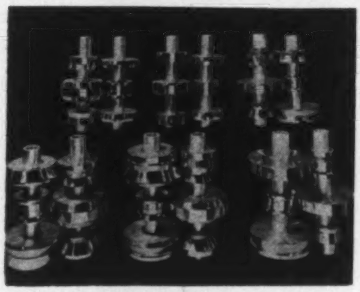


ly blow off into rubber-lined ejection chutes. With the addition of a parts hopper and feed track, the press becomes fully automatic. Here's a few of the advanced features. Rotary table nests are interchangeable with other parts. Also, by use of the quick-change hand knob, tracks can be changed to accommodate other size balls. For parts change-over, all you have to do is remove and replace the track and punch if a larger ball is necessary. Then remove and replace the nests and the machine is ready to load with parts again. (French Enterprises)

For more data circle No. 67 on postcard, p. 157

Forms Metal Shapes

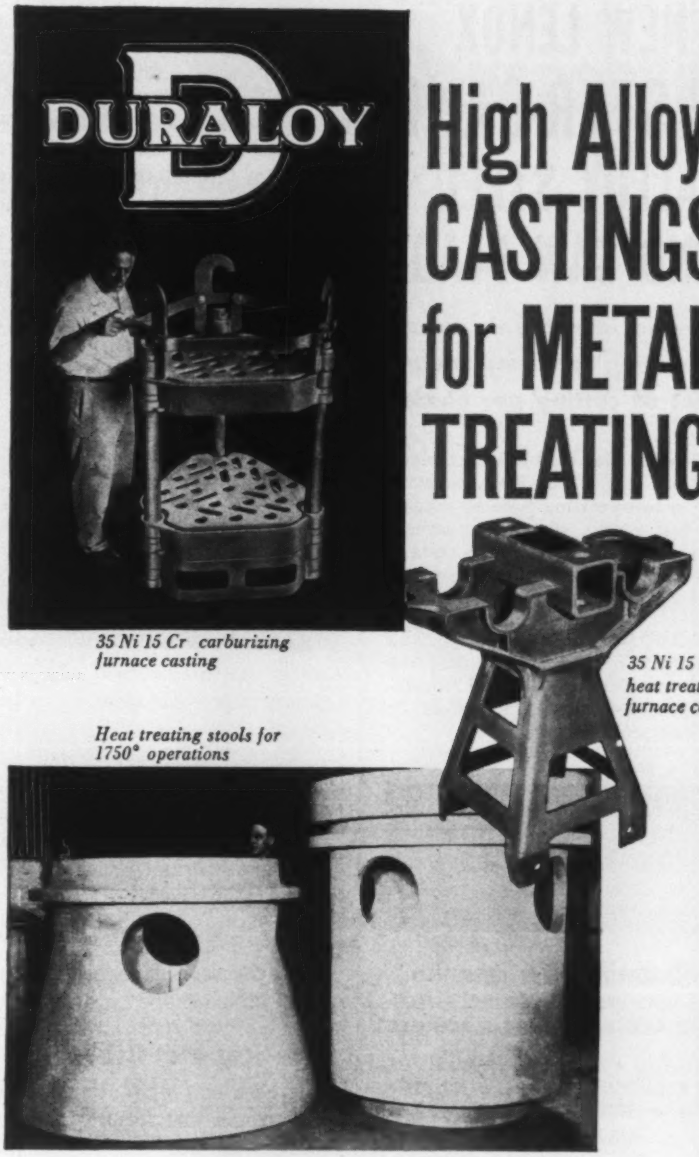
New roller dies are just one bonus feature in a line of advanced roll-forming machines. Three series of these machines differ in basic size and capacity, but bear a similarity in mechanical design, features and appearance. The three are designated Series 40, 50 and 60. Series 40 machines are primarily for the roll forming of small shapes from light-gage metals. Series 50 units form wider flat shapes and structural members of moderate size. Series 60 machines are especially suited for forming deep shapes and deep structural components. (Met-L-Roll Corp.)



For more data circle No. 68 on postcard, p. 157

Featherweight Torch

Here's a new wire-feed, all-position welding torch that weighs only 22 oz. Yet it provides great maneuverability and coolness in operation. The newcomer is engineered to meet the need for more efficient equipment for production welding of mild and stainless steels and alum-



DURALOY

High Alloy CASTINGS for METAL TREATING

35 Ni 15 Cr carburizing furnace casting

35 Ni 15 Cr heat treating furnace casting

Heat treating stools for 1750° operations

- ***Sound castings to withstand the high operating temperatures and wide temperature ranges without deformation.***

Nickel-chrome castings have long been the 'standard' for heat treating and annealing operations—and for close to forty years Duraloy castings have been considered by many metal working plants to be the 'standard' for meeting the industry's sound casting requirements.

The three Duraloy castings illustrated typify the kind of work we do for the metal treating plants.

We're in a position to cast any shape or size and of any alloy to meet your requirements.

Send for Bulletin G-261.

ALLOY CASTING INSTITUTE ACI MEMBER

The DURALOY Company
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NEW LENOX
MASTER-BAND
ALLOY STEEL
BAND SAW BLADE

Dramatic increase in blade life, cutting rate, and square inches of cutting per blade!

This special alloy steel band saw blade with the Lenox True-Weld, substantially reduces cutting costs by cutting at a faster rate, eliminating several blade changes, increasing square inches of cutting per blade, and by cutting tougher steels.

Master-Band is designed and engineered for *both* conventional and automatic machines, with an immediate 25% savings in blade cost on automatic cut-off equipment.

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Master-Band
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Master-Band IS DESIGNED FOR THESE STANDARD BAND SAW MACHINES

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Write for performance guaranteed trial order or call your industrial distributor.

LENOX
THE TOOLS IN THE PLAID BOX

AMERICAN SAW & MFG COMPANY
SPRINGFIELD, MASSACHUSETTS, U.S.A.

inum in the light gages. Rated 100 pct duty cycle at 200 amp, the new air-cooled torch accommodates wire sizes from 0.030-0.047 in. It can be used with carbon dioxide in the reactor and spray ranges, and with argon or argon gas mixtures in the reactor range. One of its special features is a nozzle-seat design that lets the operator rotate the nozzle 360° with respect to the handle. Properly used, this feature can double the operator's speed in difficult welding positions. (Westinghouse Electric Corp., Westing-Arc Dept.)

For more data circle No. 69 on postcard, p. 157

Pipe-Repair Clamp

Here's a new wrap-around, pipe-repair clamp that features bolts on one side, and a thick, butt-seal rubber gasket. This patented device provides a ⅜-in. adjustment on diameter so that a single clamp will fit a large number of pipe diamaters.

The clamp is used for the repair of cast-iron, asbestos-cement and steel pipes with diameters falling within the adjustment range of each clamp. Designed for the repair of holes, circumferential breaks or splits in industrial, slurry, process, or water piping, the clamp's adaptability permits its use on both the rough barrel or machined ends of asbestos-cement pipe, and on the run of cast-iron and steel pipe. In addition, it may be used where pipe ends are deflected up to 4° or offset ⅛ in. (Dresser Mfg. Div., Dresser Industries, Inc.)

For more data circle No. 70 on postcard, p. 157

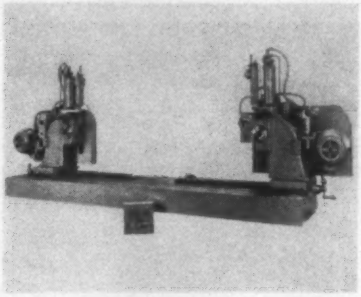
Polyurethane Coatings

Pure polyurethane coatings offer unusual versatility and ease of application. A new family of these formulations hold special interest as chemical - resistant maintenance coatings on surfaces exposed to corrosive materials or hard use. The coatings come as a ready-to-use one-part system. High resistance to chemicals, solvents and oils, as well as resistance to dirt, impact and ozone are built in. Thus, they're virtually immune to corrosion, deterioration and wear. The coatings are available in hard versions (for use over concrete, metal and similar rigid surfaces) and flexible versions (for soft plastics, fabrics, leather etc.). Another advantage is the wide variety of colors and finishes that are available. (Hughson Chemical Co.)

For more data circle No. 71 on postcard, p. 157

Mill for Aluminum

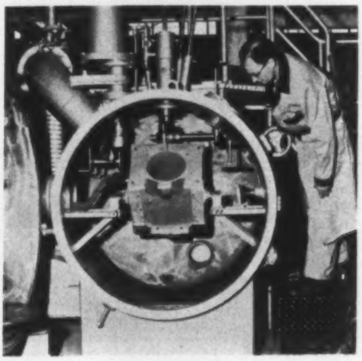
This new duplex milling machine gang mills the ends of aluminum structural extrusions. Its use eliminates the previous method of using special dies to form the ends. So successful is the machine, it is expected to amortize its cost (about $10,000) within ninety days. The new mill handles workpieces ranging in length from 60-108 in. To do this, it's equipped with a gang of milling cutters, some as large as 8-in. diam. Because of the large-diameter workpieces, and because of the intricate cutter combinations, 8 in. of vertical travel was necessary in the machine's design. This was achieved by incorporating special elongated columns. The columns are moved toward or away from each other by means of the manual screw-operated slides to which they are secured. Total travel is 24 in. For additional setup versatility, the columns may be manually positioned forward or back 1 in. (The U. S. Burke Machine Tool Co.)



For more data circle No. 72 on postcard, p. 157

Vacuum Furnaces

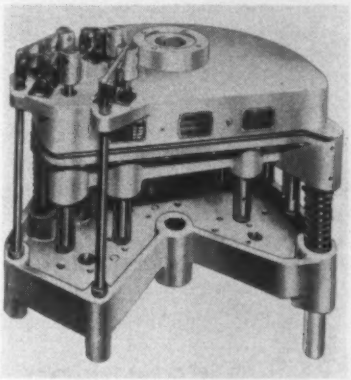
Two new vacuum furnaces are one company's latest contributions to the field of vacuum metallurgy. The first, an induction-heated melting furnace with a capacity of 50 lb, is designed for research and development ment work or for small-quantity production. The second new unit is cold-wall heat-treating furnace capable of operating at temperatures up to 3000°F. (F. J. Stokes Corp.)



For more data circle No. 73 on postcard, p. 157

Variable Spindles

Multiple-spindle drillheads having spindles with differing feed rates are now on the market. Illustrated is a 12-spindle, fixed-center drilling and reaming head with bushing plate designed and built for use with a rotary indexing fixture. Here's an example of the advantages. The first operation consists of drilling four holes half-way through the piece. The second operation drills the rest of the way through. The third operation consists of accelerated reaming through the entire depth of the previously drilled holes. Movement of the entire head is limited to the distance required for the drilling operations. The four reaming spindles must, however, travel twice as far, and at twice the feed rate, of the drilling spindles. This additional feed is provided by a lever system. (Thriftmaster Products Corp.)

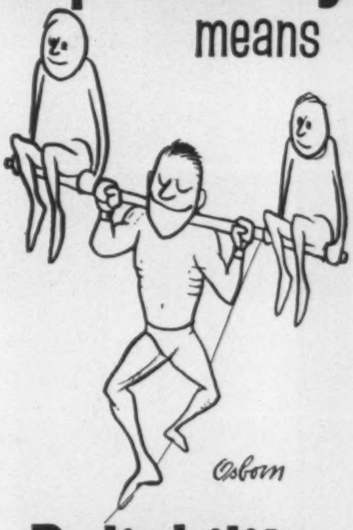


For more data circle No. 74 on postcard, p. 157

Ultrasonic Generator

With special feedback controls for high-speed cleaning, this new 400-w ultrasonic generator automatically compensates for changes in temperature, load, and liquid level. It always provides full power, thus assuring maximum cleaning efficiency. Heart of the new unit is its feedback control system. Unlike previous designs, the cleaning medium itself has been included in the feedback loop

Capacability means



Reliability

When it comes to refractories, *reliability* is Basic. You won't have to "walk a tightrope" during peak or emergency periods; steelmakers know they can depend on Basic. Its 40-year record of uninterrupted shipments is unique in the refractory industry and a valuable plus when reliability counts.

Served by two leading railroads, Basic's Maple Grove, Ohio plant ships around-the-clock — getting steelmaking refractories where they're needed . . . fast. To support rail transportation, extensive truck facilities are available for short hauls and emergency shipments.

If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

BASIC
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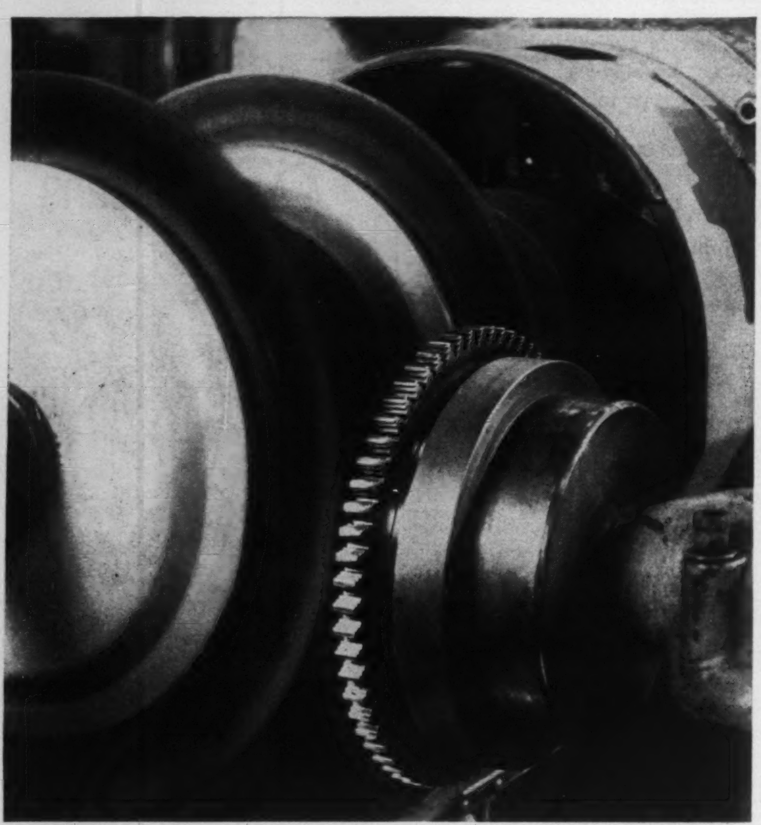


GAS TURBINE DISC DOVETAILS are deburred rapidly, automatically on Osborn 3A Finishing Machine using Osborn 14" Tufmatic® power brushes. Cycle time—floor to floor: 5 minutes . . . *9 times faster than former method.*

COST CUT 90% deburring with OSBORN power brushing

Before: deburring the 64 dovetails broached on this gas turbine disc was a problem for this major producer of jet engine components. Off-hand filing was slow and costly . . . took 45 minutes per part . . . cost about $5.00 per disc.

Now: an Osborn 3A Finishing Machine—equipped with two Osborn Tufmatic® power brushes—deburrs the part automatically in just 5 minutes . . . *9 times faster.* Finishing cost is down to 50¢ per part . . . *a 90% cost reduction.* And production quality is consistently higher, more uniform.

Osborn power brushes and advanced brushing methods can help *you* same time and money on metal finishing operations of every description—deburring, cleaning, polishing, precision blending. An **Osborn Brushing Analysis**—made at no obligation in your plant now—is the first step to savings like these. Write or call *The Osborn Manufacturing Company, Dept. F-117, Cleveland 14, Ohio. Phone ENdicott 1-1900.*

OSBORN

Metal Finishing Machines . . . and Finishing Methods
Power, Paint and Maintenance Brushes • Foundry Production Machinery

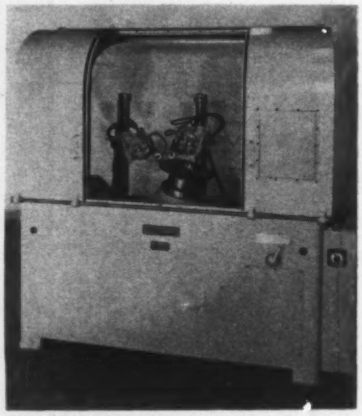
to make the system more sensitive and accurate. Only one simple control is needed for operation at peak efficiency—an on/off switch. Another interesting feature is an up-to-date activity meter. This device permits continuous monitoring of the cleaning system. It instantly indicates the presence of a gassy solution. Improper cleaning chemicals, too large a workload, or any other situation leading to lower cleaning efficiency. (Branson Instruments, Inc.)

SONOMATIC
CLEANER

For more data circle No. 75 on postcard, p. 157

Deburrs and Chamfers

This new universal gear-deburring machine utilizes the floating grinding-wheel principle. It will deburr and chamfer spur, helical, straight-bevel and spiral-bevel gears as well as splines, sprockets and odd shapes. With hood in place, the machine will accommodate 32-in. diam gears. With the hood removed, gears up to 60 in. in diameter can be handled. The work spindle will support a load of 8000 lb. This machine is simple to set up and can,

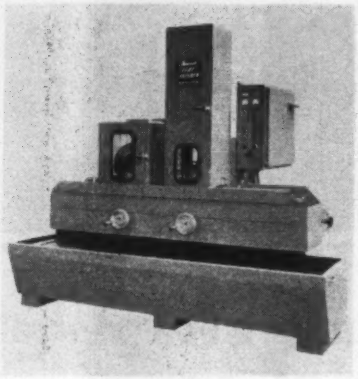


therefore, be used for short-run jobs as well as high-production quantities. Once set up, the machine is automatic except for loading and unloading of the piece part. (Redin Production Machine Co.)

For more data circle No. 76 on postcard, p. 157

Flat Finisher

Now, in addition to the abrasive belt-grinding heads, a new flat finishing machine can be equipped with a head to accommodate a wire brush for deburring and finishing. This new "combination" flat finisher is available with single or multiple heads, in 6, 8, or 12-in. widths. Some of the important features include air tensioning on head and conveyor belts, automatic belt tracking, screw feed adjustment for depth of cut graduated in 0.001-in. intervals, variable-speed conveyor drive from 0-60 fpm, and variable-density magnetic platens and hold down rollers. Tooling is cut to the minimum. And frequently, it's not required at all. This makes it simple to change from one job to another with little downtime or setup cost. (Hammond Machinery Builders, Inc.)



For more data circle No. 77 on postcard, p. 157

Induction Output Unit

Two newly designed induction heating output stations, for use at frequencies of from 1-10 kc, are now on the market. Power levels to 100 kw can be handled in the smaller unit. With the larger station, 500 kw is the limit. Both stations are rectangular. Both are equipped with a large rear access door. This design offers improved access to all

Clauss
FINE CUTLERY SINCE 1877

"The Model 'C' Impacter achieves new peaks of production speed and efficiency for Clauss"

Detail showing tong centering blank between Impacter dies, and indexing between die cavities for required number of blows at each station.

Scissor forgings produced automatically on the Impacter ..faster, better, more uniform

Clauss Cutlery Company, of Fremont, Ohio, famous manufacturer of scissors, shears and snips, is achieving remarkable results with the Cecomatic Forging Process, incorporating the Model "C" Impacter.

Better quality forgings are produced faster, with reduced scrap, and less stock required.

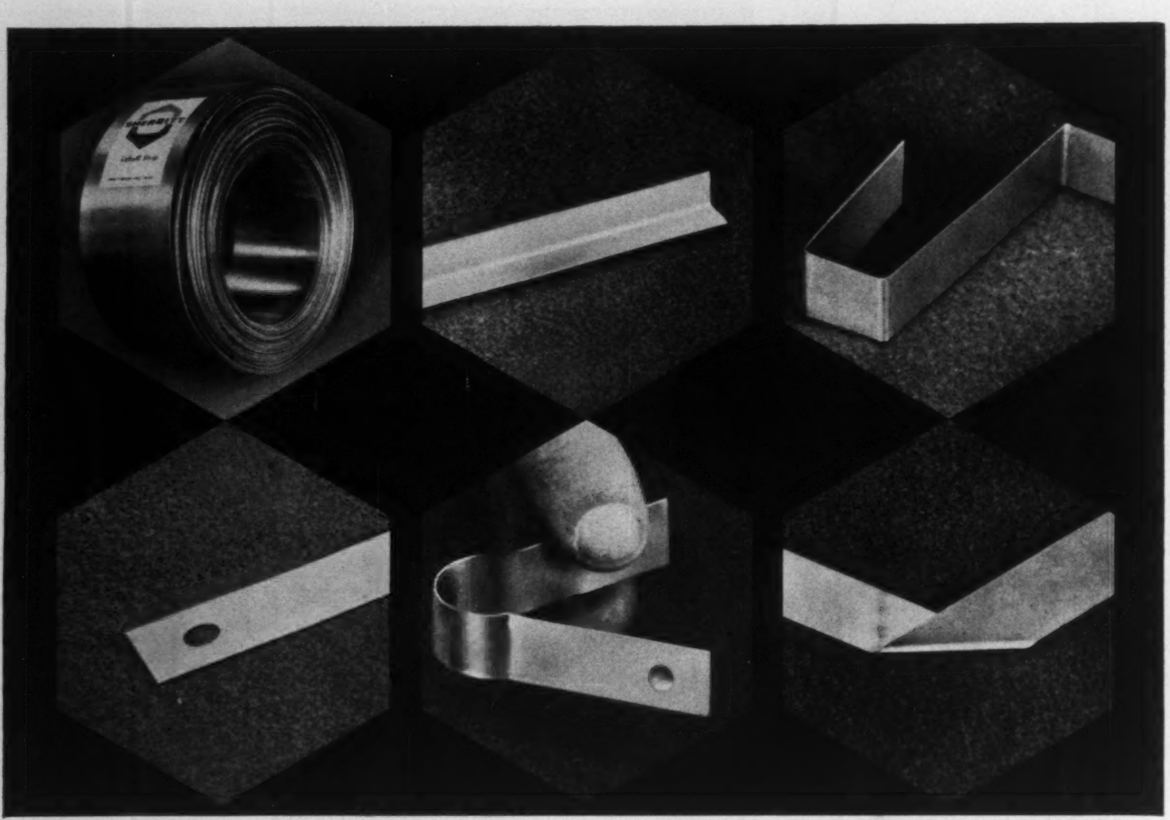
Dies last longer, scaling is reduced and parts dimensions vary less, greatly reducing mismatch of mating parts, according to R. W. Van Hook, Vice President, Clauss Cutlery Co.

Write for details and a copy of Bulletin 110-L-1, "Cecomatic Process for the Jobbing Type Production of Drop Forgings."

CHAMBERSBURG ENGINEERING COMPANY • CHAMBERSBURG, PA.

CHAMBERSBURG

THE FRANKLIN INSTITUTE'S 1961 LONGSTRETH MEDAL "FOR INVENTIONS OF HIGH ORDER" WAS AWARDED THE DESIGNERS OF THE IMPACTE



Rolled directly from pure cobalt powder, Sherritt's new ductile cobalt strip can be formed, sheared, punched, machined.

Ductile, workable cobalt strip now commercially available

Completely workable for the first time, 99.9% pure cobalt strip is now in full production at Sherritt-Gordon!

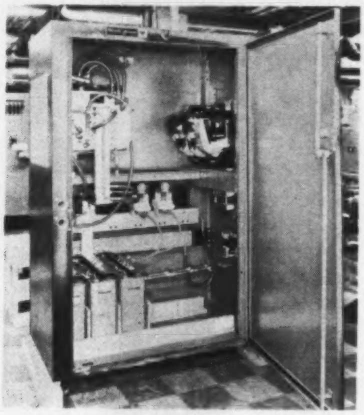
If you've thought of cobalt as "unworkable"—too brittle for any use except alloying—consider its unique combination of virtues . . .

Pure cobalt has outstanding magnetic properties; it combines high coercivity and high magnetic energy with the highest Curie point of any of the ferromagnetic materials. It is a "natural" for magnetic applications at high temperatures or for uses where thermal treatment in a magnetic field is required. It has high tensile strength for a pure metal and retains useful amounts of this strength as the temperature rises. Either in metallic form or as a thin film of oxide on metal, cobalt has important catalytic abilities. To these established properties is now added the new feature of ductility.

Should *you* design with cobalt in your product? Your imagination and processing needs will supply the answer. Certainly its new combination of properties—plus the ability to combine heat treatment and cold working to develop needed characteristics—will extend the uses of cobalt to a far wider range of products.

Sherritt cobalt strip is available in production quantities—in thicknesses ranging from .005″ to .025″ and widths of ¼″ to 6″. We'll be glad to send you a sample, prices and technical information. Simply call or write, on your letterhead, to Sherritt-Gordon Mines Limited, 25 King Street West, Toronto, Ontario, Canada.

SHERRITT GORDON MINES LIMITED

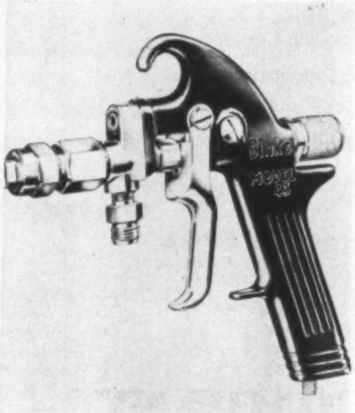


components for inspection and maintenance. In addition to the functions normally available in this type unit, both stations can be provided with an electrically-operated capacitor tap, an auto-transformer tap switch, and changing switches. These features simplify setup. In fact, in many installations, the operator can make all setup changes without entering the cubicle. (Westinghouse Electric Corp.)

For more data circle No. 78 on postcard, p. 157

Spray-Painting Gun

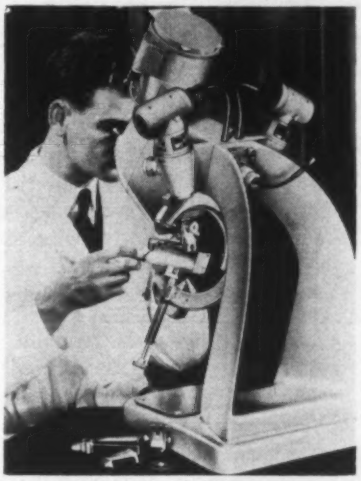
Featuring a drop-forged aluminum body with a corrosion-resistant, stainless-steel head, a new spray gun is designed for use with airless painting equipment. Larger than most airless guns, the newcomer provides very good balance. It's maneuverable, and the operator gets a firm grip. Light triggering reduces worker fatigue. Not one, but two features reduce the problem of nozzle clogging. A Monel 50-mesh screen is installed immediately ahead of the nozzle tip to trap foreign particles before the material flows through the nozzle orifice. This screen comes out easily for cleaning. In addition, an orifice cleaning needle mounts on a threaded, knurled fitting. Fitting and needle screw into the gun body for storage and instant availability. (Binks Mfg. Co.)



For more data circle No. 79 on postcard, p. 157

Checks Turbine Blades

For critical checking of leading and trailing edges of turbine and compressor blades, a blade-edge microscope comes equipped with new twin illuminators. The increased illumination throughout the microscope's optical system improves its use in full daylight. It also increases image clarity. The microscope checks not only the radii of turbine and compressor blades, but also the blending of radii with the flanks. Use of this instrument helps select blades for reduction of engine turbulence and to increase engine performance. With this shop and inspection instrument, the observed shape is compared with the master drawing inserted in the drawing holder. This method permits simultaneous viewing in the eyepiece. Blades up to 2½-in. wide and as long as desired can be checked with a total magnification of 20x. (Engis Equipment Co.)



For more data circle No. 80 on postcard, p. 157

Capacability

means

Imagination

When it comes to oxygen furnace refractories, *imagination* is Basic. And, Basic can be your "fountainhead" of new refractory ideas. Take TARBLOK and TARMIX for example.

Six years ago the first U. S. oxygen steel producer looked to Basic for tar-bonded furnace lining refractories. With four years of intensive research behind us, we were ready. Today, Basic is a fully integrated supplier of these materials — shipping to virtually every oxygen steelmaker in the Western hemisphere.

If you use basic refractories, you can depend on Basic's *capacity* and *ability*. Write for 24-page booklet outlining application of Basic's more than thirty dead-burned dolomites, ramming and gunning refractories, patching materials and tar-bonded linings for basic oxygen furnaces.

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Steel

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The IRON AGE SUMMARY

Quotas Coming in the First Half

Mills have already indicated to sales offices how much tonnage they will have to distribute.

There is space left on December books, but January looks virtually solid. February may be stronger.

▪ The rush to build steel inventories in early 1962 has resulted in informal quotas on some steel products.

There is no system of rigid allotments yet. But some mills have told district sales offices how much tonnage they can accept for their customers. These offices, in turn, have given purchasing agents some rough limits of how much they can place in the first quarter.

Auto Advances—Auto companies have advanced some January tonnage into December. This and a general pickup last week have changed the December outlook. Until a few days ago, it did not look much better than November.

A surge of orders late last week indicated a decisive gain for December, if the rate is sustained. There is little evidence that December orders are for inventory. Instead, indications are that steel consumption, particularly by the auto industry, has picked up sharply.

Tighten Squeeze—If this pickup in consumption continues, it will make the early 1962 inventory buildup that much more of a squeeze on the market. Some mills are receiving orders at a rate to justify operation of from 70 to 74 pct of capacity.

The result of the growing rate of consumption and inventory building will be a significant improvement in steelmaking operations and a lengthening of lead times as December progresses. Lead times currently show no sharp change, but there are indications of things to come.

Looking Ahead — This means that, at the moment, there are openings in December for virtually all products. But, with the situation fluid, this could change in a hurry. If more flat-rolled automotive tonnage is advanced from January to December, which is likely, cold-rolled sheet would move out by weeks in a few hours.

Some of the new auto business for December is related to inventory building, but not all. Mills are attempting to determine how much of the new business by both automakers and general users is for inventory and how much is for current needs. But it is clear that the general tempo of business has picked up significantly.

Buildup Plans — While most major consumers are planning to build from 30 to 60 days of inventory by the end of next June, there are others who dismiss the possibility of a strike or are convinced that, if there is one, it will be short.

There is no evidence of any change in the steel labor climate. And among steelworkers themselves, the general belief is that there will be a strike. This is evidenced by savings buildups among workers, a general tightening of their belts more than six months ahead of the deadline, and militant talk at the local level.

Generally, the issues that caused the 1959 strike are still unresolved. And there is every indication that neither side has modified its position. This spells tough negotiations down to the bitter end.

District Steel Production Indexes 1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	105	105	111	76
Buffalo	104	100	101	67
Pittsburgh	103	101	105	69
Youngstown	92	98	98	63
Cleveland	104	108	115	85
Detroit	150	147	133	89
Chicago	113	113	110	78
Cincinnati	139	139	127	73
St. Louis	129	141	127	77
Southern	97	95	101	83
Western	106	107	121	77
U. S. Index	109.1	109.3	101.4	74.8

Source: American Iron & Steel Institute

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000 Omitted)	2,032	2,037	86,880	91,809
Ingot Index				
(1957-59=100)	109.1	109.3	99.2	104.9
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel base (Cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.41
Scrap No. 1 hvy (Gross ton)	$32.83	$32.83	$34.50	$28.50
No. 2 bundles	$23.17	$22.83	$24.17	$18.50

Buyers' Market Rules Lubricants

Lubricant makers fight to keep prices stable. They stress product performance and "total costs"; play down price tags.

Buyers show interest in cost-saving trends but still hammer at prices.

■ Lubricant makers, caught in a buyers' market, are fighting hard to keep a floor under prices. And in their selling they are stressing total costs to customers rather than product prices.

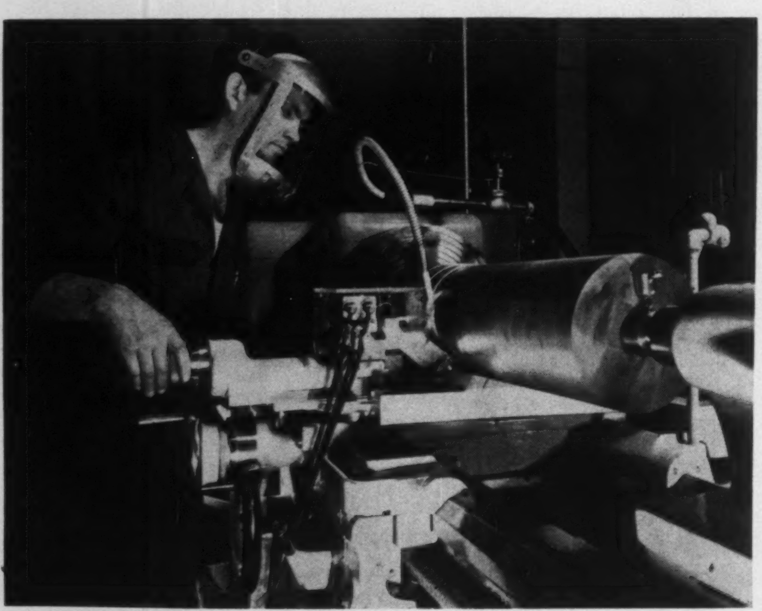
One of the important trends in the field has been the increased use of universal lubricants. The trend is an example of the "total cost" approach being stressed. Universal lubricants usually cost more, but they do more jobs and buyers don't have to handle and stock a variety of types. Inventory costs are reduced.

A spokesman for one lubricant maker explains: "Where a customer used to stock 20 drums of lubricant he now stocks perhaps five."

Bulk Buying—He mentions another development that also reduces handling costs. "Other buyers in an effort to reduce per-gallon costs have been switching to bulk storage. With bulk purchases they get a cheaper unit price and reduce handling time because they don't have to wrestle those drums around."

But advances are also being made in specialty lubricants. For example, Shell Oil Co. recently introduced a line of transparent lubricants that permit better viewing of the workpiece. The claim is made that it is easier to work with and is neater.

Still another trend is toward what some lubricant makers call "organized lubricants." Texaco Co., for instance, has its "Stop-Loss" program. At the heart of the program is Texaco's technique of making a plant or company-wide analysis of all the lubricant needs of a buyer. They then make a recommendation of the best lubricant for each job, the amount needed, and most economical buying quantities and methods.



PRODUCTION BOOSTER: A 25 pct production increase is claimed with use of a new cutting oil used here with throwaway carbide inserts.

Single Supplier—However, some other companies, particularly smaller ones, are wary of this selling approach. They say it limits a buyer company to just one supplier.

Any talk of lubricant prices usually leads to hot debate between buyers and sellers. Buyers, aware of the favorable market conditions, and anxious to make best possible purchases, are reportedly driving hard on prices. Some suppliers say they are driving too hard on this point and miss out on long-term benefits.

Many lubricant makers are trying to generate a trend to more buying on performance. Says a spokesman for one maker: "Too many companies still buy lubricants on the basis of minimum physical specs, or contents. This way, some of our new or improved products don't have a chance."

This spokesman feels that higher prices for new or improved products can be justified through longer tool life, less downtime and fewer rejects of tooled parts.

Case in Point—Another lubricant maker agrees with this spokesman and offers a story as illustration.

"Some years ago our people recommended a customer use a standard black oil for a tapping operation. A competitor cut our price, and we met it. He cut it again. We figured he had to be watering his lubricant with neutral oils, so we watered ours and met him. The price was cut again, and we just dropped out.

"The other day our fieldman called on this former customer and found he had problems. He was still tapping, but he was breaking and getting poor performance from $50 taps. We recommended the same product that we had years ago. He tried it, was satisfied, and is now a customer again."

CORROSION? WEAR?

End pump problems with ADVANCED

Deming End Suction Centrifugal Pump. 1" to 6" discharge size. 10 G.P.M. to 2400 G.P.M. Heads to 240 feet. ¼ H.P. to 25 H.P. Most sizes right or left hand rotation.

DEMING CENTRIFUGALS

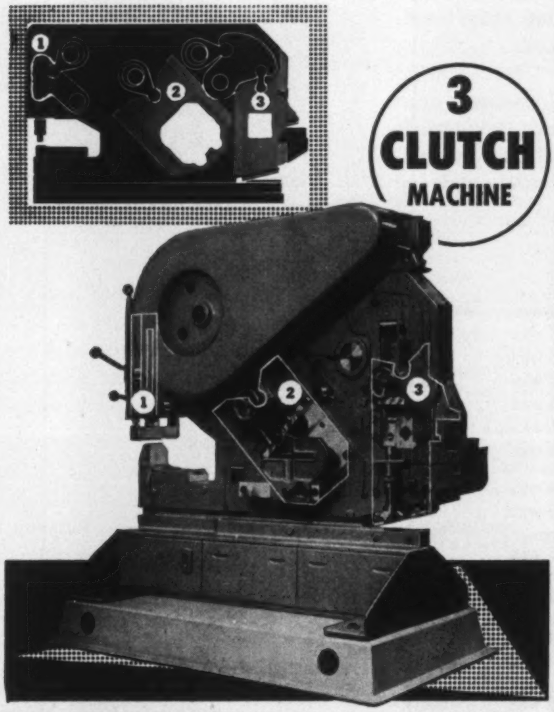
Deming advance design features show you why Deming Pumps handle toughest jobs with ease—

- Liquid ends range from tough cast iron to special corrosion-resistant alloys.
- 4-piece liquid ends get rigid, leak-stopping support — from ruggedly designed power end and 2-ball bearing suspension.
- You can regulate capacity and head—because of Deming axial adjustment.
- A Deming is the simplest to service.

Send your problem to Deming—"Pump Information Headquarters."

DEMING
DIVISION CRANE CO.
1171 Broadway • Salem, Ohio

Write for Bulletin 4011-E



3 CLUTCH MACHINE

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Caution Goes With Delivery Promises

Some deliveries have already been lengthened, while others are expected to follow soon.

Meanwhile, inventory building picks up among auto producers.

▪ Delivery promises are lengthening out slightly, but there is some nervousness behind firm commitments.

In isolated cases, the short side has narrowed. This means that quick delivery is not what it used to be. In other cases, the long side has lengthened, indicating mills are uneasy about promising delivery in a definite interval.

In Chicago, for example, mills that would promise delivery on a given week will not set the time interval shorter than a month. This gives a four-week interval within which mills can deliver and still fulfill promises.

Delivery Changes—Specific delivery promise changes of significance include:

In the East, one week was added to cold-rolled sheet and carbon strip on the short side. In other words, from four to five weeks instead of from three to five. Heavy plate lengthened out to from three to five weeks.

In Pittsburgh, cold-rolled sheet lengthened. In Detroit, little change was noted, but it is expected that delivery promises there will have to lengthen significantly in the next month.

In Chicago, promises are expected to dump out sharply, but currently, only sheet and strip lengthened out by one week.

What this means is that as of last week, at least, there was open space in December for most products. By this time next month, however, the situation will be entirely different.

Delivery Promises at a Glance

	East	Pittsburgh	Cleveland	Detroit	Chicago	West Coast
CR Carbon Sheet	4–5 wks	4–5 wks	4–6 wks	2–6 wks	4–8 wks	6 wks
HR Carbon Sheet	3–4 wks	3–4 wks	3–4 wks	2–4 wks	3–6 wks	6 wks
CR Carbon Strip	4–5 wks	4–5 wks	4–6 wks	2–6 wks	4–8 wks	5–6 wks
HR Carbon Strip	3–4 wks	3–4 wks	3–4 wks	2–4 wks	3–5 wks	6 wks
HR Carbon Bars	2–4 wks	2–3 wks	3–4 wks	1–5 wks	3–5 wks	4–5 wks
CF Carbon Bars	2–4 wks	2–3 wks	Stock–4 wks	1–6 wks	2–5 wks	1–2 wks
Heavy Plate	3 wks	4–5 wks			4–6 wks	8 wks
Light Plate	2–3 wks	1–2 wks	3–4 wks		3–5 wks	7 wks
Merchant Wire	Stock	Stock	Stock		Stock–3 wks	Stock
Oil Country Goods	Stock	Stock	Stock		Stock–3 wks	
Linepipe	Stock	1–4 wks	Stock		Stock–4 wks	Stock–4 wks
Buttweld Pipe	Stock	Stock	Stock	Stock	2–4 wks	Stock–4 wks
Structurals	2–4 wks	1–2 wks	1–4 wks	1–4 wks	4–5 wks	Stock–4 wks
CR Stainless Sheet	Stock–4 wks	Stock–3 wks	Stock–6 wks	Stock–6 wks		
CR Stainless Strip	Stock–4 wks	Stock–3 wks	Stock–6 wks	Stock–6 wks		

Sheet and Strip — Inventory building among some auto plants has picked up. Flat-rolled, especially, appears to show more action. Inventory building at warehouse levels has increased but not as much as in the auto circles.

In **Pittsburgh** three mills reported auto plants coming in for extra December tonnage of cold rolled sheets. However, February and March orders from auto producers are still being delayed. A major mill in the **Philadelphia** area says the auto companies expect to increase monthly steel tonnages 40 to 50 pct from January through May. In **Detroit** one automaker has moved January into December.

In the **Midwest,** mills building tinplate stocks are nearing top inventory on that grade. And mills are getting cautious on their rolling schedules. By early December, delivery promises on sheet are expected to be extended by a week.

Bar—No changes were reported for this market on the **East Coast** where it has been generally lagging. However, in the **Midwest,** mills are running full at 18-20 turns. Warehouses appear to be boosting stocks on this grade at a faster rate than they are on sheet. This suggests they may fear some delivery problems on bar.

Plates and Shapes—There's less advance buying for these products. In **Pittsburgh,** mills are getting a few orders and inventory programs are being discussed. But heavy inventory buying isn't expected before March. In the **Midwest,** buyers are extending their lead times but also are cautious about planning any inventory.

Tinplate — Demand for tinplate remains about the same. But there may be problems. In **Pittsburgh,** one mill is already having difficulty keeping up with the rising demand for thin tinplate. It predicts thin tinplate will account for at least 25 pct of total tinplate demand next year.

Pipe and Tubing — Linepipe is off seasonally. Standard pipe and oil country tubular goods show no change.

COMPARISON OF PRICES

(Effective Nov. 27, 1961)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Nov. 27 1961	Nov. 17 1961	Oct. 30 1961	Nov. 29 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	14.10
Stainl's C-R strip (No. 302)	49.50	49.50	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.49¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Nov. 27 1961	Nov. 17 1961	Oct. 30 1961	Nov. 29 1960
Pig Iron: (per gross ton)				
Foundry, del'd. Phila.	$70.68	$70.68	$70.68	$70.11
Foundry, South Cin't.	71.92	71.92	71.92	71.92
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd. Philadelphia	70.11	70.11	70.11	69.61
Basic Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese 74-76 pct Mn. Cents per lb‡	11.00	11.00	11.00	11.00
Pig Iron Composite: (per gross ton)				
Pig Iron	$66.44	$66.44	$66.44	$66.32
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh,	$33.50	$33.50	$33.50	$26.50
No. 1 steel, Phila. area	33.50	33.50	37.50	33.50
No. 1 steel, Chicago	31.50	31.50	32.50	25.50
No. 1 bundles, Detroit	29.50	29.50	29.50	21.50
Low phos., Youngstown	36.50	36.50	37.50	28.50
No. 1 mach'y cast., Pittsburgh	44.50	44.50	45.50	45.50
No. 1 mach'y cast., Phila.	47.50	47.50	48.50	47.50
No. 1 mach'y cast., Chicago	44.50	44.50	44.50	41.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$32.83	$32.83	$34.50	$28.50
No. 2 bundles	23.17	22.83	24.17	18.50
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.75-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper electrolytic, Conn.	$31.00	$31.00	$31.00	$30.00
Copper Lake, Conn.	31.00	31.00	31.00	30.00
Tin, Straits, N. Y.	122.375†	123.75	121.875	102.75
Zinc, East St. Louis	11.50	11.50	11.50	13.00
Lead, St. Louis	9.80	9.80	11.00	11.80
Aluminum, ingot	24.00	24.00	24.00	26.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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Downtrend Slows As Market Levels

Prices are steady or varying by $1. Many say there is leveling rather than continuing downtrend.

Export continues out of the picture but several large domestic buyers are moving toward the market.

▪ Chicago is the strong spot on the nation's scrap market this week. Prices are firming with a $1 rise recorded in the middle grades.

Elsewhere dealers are beginning to feel more strength in the market. They report slight declines in several areas, but there is a feeling that the market has bottomed out or soon will.

The plunging market of a few weeks back has now been replaced with a leveling price situation.

Although many markets report business quiet, there is a definite optimism growing for the first quarter of 1962.

Some markets still fear further price declines, but suggest that attractive prices could draw speculators into the market and reverse any downward trend.

There are several reports that large buyers are moving back towards the market.

Export remains extremely quiet, as it has been for several weeks.

The Iron Age composite price for No. 1 heavy melting is at $32.83 for the third straight week. The No. 2 bundles composite price rose to $23.17 from $22.83 on the basis of a price rise in Chicago.

Pittsburgh—The market here is quiet and weak. No. 2 bundles are being bought locally for a nearby district at prices generally unchanged from last week. Aside from this, there is little current activity in the dealer market. Most brokers are looking for industrial prices to drop again. The tonnage of factory bundles being offered locally is down slightly from last month and consumers admit prices are reaching attractive levels.

Chicago — A firming Chicago market was still betting that factory bundles, because of the large volume of material offered, would not advance. Despite this, other grades held or advanced mildly through much of the list. New offers for stainless drew some scrap, but material is still being held by brokers despite price advances in this grade.

Philadelphia—The market outlook remains uncertain here. Some dealers feel bottom had been reached; others expect further price declines. Pressure on prices continues, but it is not as strong as it was two weeks ago. Domestic business is still spotty. Dealers pin their hopes for an upturn on a more stable pattern of mill buying. Turnings prices are off $2 on appraisal, on the basis of a weakened market.

Cleveland — Market continues lethargic with few mills interested. Auto bundles in area this week were about 23,000 tons. Current bargains may flush out speculators for an expected good market next year, but there is no evidence of mill interest so far. Some foundry buying is expected for December, not too much around yards.

Cincinnati—Outlook is still fairly optimistic based on hopes several area mills will be in the market. Dealers are not willing to part with large tonnages at present levels.

New York—Prices on steelmaking grades are unchanged in a fairly quiet market, but some brokers believe this steadiness indicates the market is firming a little. Domestic demand remains slow. Some cargoes are now loading for export. Cast grades are expected to drop one or two dollars a ton later this week when foundries place orders for December delivery.

Detroit — December industrial lists, with large tonnages due, are expected to be down slightly in price from November. Bidding began early this week. Canadians have been absorbing some No. 1 heavy melting.

St. Louis—Dealers feel the market has bottomed out and is marking time. The outlook is considerably brighter, although no sharp upturn is expected. Around the first of the year, prices are expected to edge upward. A large buyer has returned to the market and prices are beginning to be more representative.

Birmingham — Scrap movement, although better than last week, is still slow. Brokers say some opposition has developed to cast and structural scrap quotations, and the general tone of the market is more reassuring.

Buffalo — The market is off another dollar, but all signs point to a leveling off period for the time being. Local business is slow.

Boston — A quiet market has noted another price drop in several categories. No. 1 and No.2 heavy melting dropped another dollar as dealers hope for an upturn.

Houston — Dealers and brokers are marking time while awaiting moves by the district mill and other consumers. The quiet market has maintained price stability.

West Coast — Continuing weak prices give the market a gloomy outlook. Some dealers look for further price reductions in December. No. 1 cupola cast dropped $2 per ton in San Francisco and Los Angeles.

SCRAP PRICES *(Effective Nov. 27, 1961)*

Pittsburgh

No. 1 hvy. melting	$33.00 to	$34.00
No. 2 hvy. melting	27.00 to	28.00
No. 1 dealer bundles	34.00 to	35.00
No. 1 factory bundles	39.00 to	40.00
No. 2 bundles	25.00 to	26.00
No. 1 busheling	33.00 to	34.00
Machine shop turn.	14.00 to	15.00
Shoveling turnings	19.00 to	20.00
Cast iron borings	18.00 to	19.00
Low phos. punch'gs plate	40.00 to	41.00
Heavy turnings	29.00 to	30.00
No. 1 RR hvy. melting	38.00 to	39.00
Scrap rails, random lgth.	44.00 to	45.00
Rails 2 ft and under	49.00 to	50.00
RR specialties	44.00 to	45.00
No. 1 machinery cast.	44.00 to	45.00
Cupola cast.	36.00 to	37.00
Heavy breakable cast.	30.00 to	31.00
Stainless		
18-8 bundles and solids	180.00 to	185.00
18-8 turnings	110.00 to	115.00
430 bundles and solids	80.00 to	85.00
410 turnings	50.00 to	55.00

Chicago

No. 1 hvy. melting	$31.00 to	$32.00
No. 2 hvy. melting	29.00 to	30.00
No. 1 dealer bundles	31.00 to	32.00
No. 1 factory bundles	35.00 to	36.00
No. 2 bundles	21.00 to	22.00
No. 1 busheling	32.00 to	33.00
Machine shop turn.	15.00 to	16.00
Mixed bor. and turn.	17.00 to	18.00
Shoveling turnings	17.00 to	18.00
Cast iron borings	17.00 to	18.00
Low phos. forge crops	42.00 to	43.00
Low phos. punch'gs plate, ¼ in. and heavier	42.00 to	43.00
Low phos. 2 ft and under	39.00 to	40.00
No. 1 RR hvy. melting	35.00 to	36.00
Scrap rails, random lgth.	42.00 to	43.00
Rerolling rails	56.00 to	57.00
Rails 2 ft and under	48.00 to	49.00
Angles and splice bars	41.00 to	42.00
RR steel car axles	54.00 to	55.00
RR couplers and knuckles	41.00 to	42.00
No. 1 machinery cast.	44.00 to	45.00
Cupola cast.	38.00 to	39.00
Cast iron wheels	33.00 to	34.00
Malleable	43.00 to	44.00
Stove plate	32.00 to	33.00
Steel car wheels	38.00 to	39.00
Stainless		
18-8 bundles and solids	170.00 to	175.00
18-8 turnings	100.00 to	105.00
430 bundles and solids	85.00 to	90.00
430 turnings	50.00 to	55.00

Philadelphia Area

No. 1 hvy. melting	$33.00 to	$34.00
No. 2 hvy. melting	27.00 to	28.00
No. 1 dealer bundles	35.00 to	36.00
No. 2 bundles	22.00 to	23.00
No. 1 busheling	35.00 to	36.00
Machine shop turn.	10.00 to	11.00
Mixed bor. short turn.	12.00 to	13.00
Cast iron borings	12.00 to	13.00
Shoveling turnings	16.00 to	17.00
Clean cast. chem. borings	28.00 to	29.00
Low phos. 5 ft and under	37.00 to	38.00
Low phos. 2 ft punch'gs	39.00 to	40.00
Elec. furnace bundles	36.00 to	37.00
Heavy turnings	26.00 to	27.00
RR specialties	40.00 to	41.00
Rails, 18 in. and under	48.00 to	49.00
Cupola cast.	37.00 to	38.00
Heavy breakable cast.	37.00 to	38.00
Cast iron car wheels	40.00 to	41.00
Malleable	47.00 to	48.00
No. 1 machinery cast.	47.00 to	48.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.50 to	$32.50
No. 2 hvy. melting	25.00 to	26.00
No. 1 dealer bundles	34.50 to	35.50
No. 2 bundles	18.00 to	19.00
Machine shop turn.	8.00 to	9.00
Shoveling turnings	13.00 to	14.00
Cast iron borings	13.00 to	14.00
Low phos. 18 in. and under	39.00 to	40.00
Rails, random length	41.00 to	42.00
Rails, 18 in. and under	47.00 to	48.00
No. 1 cupola cast.	34.00 to	35.00
Heavy breakable cast.	29.00 to	30.00
Drop broken cast.	44.00 to	45.00

Youngstown

No. 1 hvy. melting	$34.50 to	$35.50
No. 2 hvy. melting	24.00 to	25.00
No. 1 dealer bundles	34.50 to	35.50
No. 2 bundles	21.00 to	22.00
Machine shop turn.	17.00 to	18.00
Shoveling turnings	19.00 to	20.00
Low phos. plate	36.00 to	37.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Cleveland

No. 1 hvy. melting	$31.50 to	$32.50
No. 2 hvy. melting	22.00 to	23.00
No. 1 dealer bundles	31.50 to	32.50
No. 1 factory bundles	34.50 to	35.50
No. 2 bundles	19.00 to	20.00
No. 1 busheling	31.50 to	32.50
Machine shop turn.	14.00 to	15.00
Mixed bor. and turn.	17.00 to	18.00
Shoveling turnings	17.00 to	18.00
Cast iron borings	17.00 to	18.00
Cut structural & plates, 2 ft & under	37.00 to	38.00
Low phos. punch'gs plate	32.50 to	33.50
Drop forge flashings	31.50 to	32.50
Foundry steel, 2 ft & under	32.50 to	33.50
No. 1 RR hvy. melting	35.00 to	36.00
Rails 2 ft and under	45.00 to	46.00
Rails 18 in. and under	46.00 to	47.00
Steel axle turnings	24.00 to	25.00
Railroad cast.	42.00 to	43.00
No. 1 machinery cast.	43.00 to	44.00
Stove plate	37.00 to	38.00
Malleable	48.00 to	49.00
Stainless		
18-8 bundles	160.00 to	165.00
18-8 turnings	95.00 to	100.00
430 bundles	75.00 to	80.00

Buffalo

No. 1 hvy. melting	$27.00 to	$28.00
No. 2 hvy. melting	24.00 to	25.00
No. 1 busheling	27.00 to	28.00
No. 1 dealer bundles	27.00 to	28.00
No. 2 bundles	22.00 to	23.00
Machine shop turn.	12.00 to	13.00
Mixed bor. and turn.	13.00 to	14.00
Shoveling turnings	16.00 to	17.00
Cast iron borings	14.00 to	15.00
Low phos. plate	33.00 to	34.00
Structural and plate, 2 ft and under	35.00 to	36.00
Rails 2 ft and under	46.00 to	47.00
Scrap rails, random lgth.	36.00 to	37.00
No. 1 machinery cast.	43.00 to	44.00
No. 1 cupola cast.	37.00 to	38.00

St. Louis

No. 1 hvy. melting	$31.00 to	$32.00
No. 2 hvy. melting	27.00 to	28.00
Foundry steel, 2 ft.	29.00 to	30.00
No. 1 dealer bundles	32.00 to	33.00
No. 2 bundles	22.00 to	23.00
Machine shop turn.	13.50 to	14.50
Shoveling turnings	15.50 to	16.50
Cast iron borings	21.00 to	22.00
No. 1 RR hvy. melting	34.00 to	35.00
Rails random lengths	38.00 to	39.00
Rails, 18 in. and under	43.00 to	44.00
RR specialties	38.00 to	39.00
Cupola cast.	34.00 to	35.00
Heavy breakable cast.	31.00 to	32.00
Stove plate	30.00 to	31.00
Cast iron car wheels	33.00 to	34.00
Rerolling rails	53.00 to	54.00
Unstripped motor blocks	33.00 to	34.00

Birmingham

No. 1 hvy. melting	$33.00 to	$34.00
No. 2 hvy. melting	23.00 to	24.00
No. 1 dealer bundles	33.00 to	34.00
No. 2 bundles	20.00 to	21.00
No. 1 busheling	36.00 to	37.00
Machine shop turn.	16.00 to	17.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	9.00 to	10.00
Electric furnace bundles	36.00 to	37.00
Elec. furnace, 3 ft & under	34.00 to	35.00
Bar crops and plate	41.00 to	42.00
Structural and plate, 2 ft.	40.00 to	41.00
No. 1 RR hvy. melting	34.00 to	35.00
Scrap rail, random lgth.	40.00 to	41.00
Rails, 18 in. and under	44.00 to	46.00
Angles and splice bars	44.00 to	45.00
No. 1 cupola cast.	38.00 to	39.00
Stove plate	38.00 to	39.00
Cast iron car wheels	33.00 to	34.00
Unstripped motor blocks	29.00 to	30.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$27.00 to	$28.00
No. 2 hvy. melting	21.00 to	22.00
No. 2 dealer bundles	15.00 to	16.00
Mixed bor. and turn.	5.00 to	6.00
Machine shop turnings	5.00 to	6.00
Shoveling turnings	7.00 to	8.00
Clean cast. chem. borings	17.00 to	18.00
No. 1 machinery cast.	36.00 to	37.00
Mixed yard cast.	33.00 to	34.00
Heavy breakable cast.	31.00 to	32.00
Stainless		
18-8 prepared solids	150.00 to	155.00
18-8 turnings	80.00 to	85.00
18-8 prepared solids	150.00 to	155.00
430 turnings	20.00 to	25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$28.00 to	$29.00
No. 2 hvy. melting	23.00 to	24.00
No. 1 dealer bundles	29.00 to	30.00
No. 2 bundles	19.00 to	20.00
No. 1 busheling	26.00 to	27.00
Drop forge flashings	26.00 to	27.00
Machine shop turn.	9.00 to	10.00
Mixed bor. and turn.	13.00 to	14.00
Shoveling turnings	13.00 to	14.00
Cast iron borings	13.00 to	14.00
Heavy breakable cast.	27.00 to	28.00
Mixed cupola cast.	30.00 to	31.00
Automotive cast.	39.00 to	40.00
Stainless		
18-8 bundles and solids	170.00 to	175.00
18-8 turnings	75.00 to	80.00
430 bundles and solids	65.00 to	70.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$24.00 to	$25.00
No. 2 hvy. melting	17.00 to	18.00
No. 1 dealer bundles	24.00 to	25.00
No. 2 bundles	15.00 to	16.00
No. 1 busheling	24.00 to	25.00
Machine shop turn.	3.00 to	4.00
Shoveling turnings	8.00 to	9.00
Clean cast. chem. borings	15.50 to	16.50
No. 1 machinery cast.	38.00 to	39.00
Mixed cupola cast.	29.00 to	30.00
Heavy breakable cast.	27.00 to	28.00

San Francisco

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	30.00
No. 1 dealer bundles	25.00
No. 2 bundles	21.00
Machine shop turn.	12.00
Cast iron borings	12.00
No. 1 cupola cast.	45.00

Los Angeles

No. 1 hvy. melting		$35.00
No. 2 hvy. melting		30.00
No. 1 dealer bundles		24.00
No. 2 bundles		21.00
Machine shop turn.		12.00
Shoveling turnings		12.00
Cast iron borings		12.00
Elec. furnace 1 ft and under (foundry)		44.00
No. 1 cupola cast.	$42.00 to	43.00

Seattle

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	30.00
No. 2 bundles	21.00
No. 1 cupola cast.	34.00
Mixed yard cast.	29.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$27.00
No. 2 hvy. melting cut 3 ft and under	24.00
No. 1 dealer bundles	28.00
No. 2 bundles	21.50
Mixed steel scrap	19.00
Bush., new fact., prep'd.	27.00
Bush., new fact., unprep'd.	21.00
Machine shop turn.	8.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	32.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting		$33.00
No. 2 hvy. melting		30.00
No. 2 bundles		21.00
Machine shop turn.		12.00
Shoveling turnings		15.00
Cut structural plate 2 ft & under	$42.00 to	43.00
Unstripped motor blocks	28.00 to	29.00
Cupola cast.	34.00 to	35.00
Heavy breakable cast.	28.00 to	29.00

1962 Copper Market Upswing Expected

Latest statistics point to a leveling-off period after the strong market of the first three quarters.

Analysis of October, November and December sales leads to optimism for next year's copper market.

- Inventory adjustment is the key to December copper sales. The domestic copper market has leveled off, but there is optimism that an upswing will begin in January.

Statistics for the total tonnage sold to date in 1961 are promising, and the present slowdown will not alter the overall industry tonnage growth.

One Reason—December has become an inventory adjustment month, particularly for fabricators. Buying, or the lack of it, is directly related to target stock levels rather than to the rate of incoming orders.

Recent statistics from the U. S. Copper Assn. illustrate the situation. The latest month reported is October, and November seems to be little changed with some slight improvement possible.

Sales Slump—Copper sold during October dropped to 117,338 tons from September's 123,152 tons.

Net consumption by fabricators dropped in October to 126,250 tons from 130,616 in September. New business booked by the fabricators during the month also dropped, to 122,704 tons (contained copper) from 134,052 in the previous month.

The Bright Side—Total tonnage for the first ten months of 1961 presents a firm basis for the industry's optimism. Copper sales through October total 1,203,810 tons, compared to 1,190,121 in all of last year.

Copper content in sales by fabricators in the first 10 months was 1,214,420 tons, compared to 1,160,954 in 1960.

November Stocks—At the beginning of November the U. S. Copper Assn. estimated refined stocks of copper at 542,659 tons, compared to 595,366 at the beginning of the year. The change appears slight; a break-down of the figure shows 465,874 tons of fabricator stock which includes: refined shapes, material in process, in finished form, and in scrap.

Unsold stocks held by the copper refineries at the beginning of this month totaled 62,200 tons, compared to 131,741 at the beginning of the year.

1962 Forecast—This, combined with the fact that for the last three months consumption of copper by fabricators has clearly topped purchases, seems to indicate that the market will be ripe for some sharp moves early in 1962.

Aluminum

Primary production rose in October to 167,295 tons from 159,572 in September, reports the Aluminum Assn.

This brings the total for the year thus far to 1,571,922 tons, which isn't too far off the 1,687,787 tons made in the same period last year.

Few official forecasts have been made yet on industry production this year. Based on the year-to-date they should all hover around 1.9 million tons.

Super-Purity Aluminum

Aluminum Co. of America developed a process for making and is now a commercial supplier of super-purity aluminum. This is metal in the 99.95 to 99.99 pct pure range. It carries a high premium, and its markets bear little resemblance to commercial purity metal.

Previously, Kaiser was the only one of the Big Three U. S. producers making super-purity metal.

Alcoa sums up the super-purity market situation: "Super-purity aluminum is now being consumed at an accelerating rate by the petroleum and chemical industries, which utilize it as a catalyst carrier." Alcoa also reports, "Makers of electrical and electronics equipment employ it as foil in transformers and capacitors."

Tin Prices for the Week

November 17—123.75; November 20—123.125; November 21—122.75; November 22—122.75; November 23—Holiday; November 24 — 122.50; November 27 — 122.375*

*Estimate

Primary Prices

(cents per lb.)	current price	last price	date of change
Aluminum Ingot	24.00	26.00	9/25/61
Copper (E)	31.00	30.00	5/16/61
Copper (CS)	31.00	30.00	5/17/61
Copper (L)	31.00	30.00	5/17/61
Lead, St. L.	9.80	10.30	11/13/61
Lead, N. Y.	10.00	10.50	11/13/61
Magnesium Ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/58
Nickel	81.25	74.00	6/30/61
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	11.50	12.50	1/12/61
Zinc, N. Y.	12.00	13.00	1/12/61

ALUMINUM: 99% Ingot. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. Other primary prices, pg. 189.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb. f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.037	.047-.060	.076-.096	.154-.250
1100, 3003	47.4	46.4	45.4	44.4
5062	54.8	52.0	49.8	46.8
6061-0	53.0	50.3	48.4	47.9

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-5/16	11/32-23/32	3/4-1 1/16	1 3/32-1 1/2
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250-2.00	.188	.081	.032
AZ31B Stand, Grade	......	67.9	69.0	77.9	103.1
AZ31B Spec.	......	93.3	96.9	108.7	171.3
Tread Plate	......	70.6	71.7	......	......
Tooling Plate	73.0	......	......	......	......

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting)	37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting)	40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	147	126	145
Strip, CR	133	114	145
Rod, bar, HR	116	95	116
Angles, HR	116	95	116
Plates, HR	139	116	133
Shot, blocks	...	93	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	56.13	....	53.61	57.32
Brass, Yellow	49.27	49.56	49.21	53.43
Brass, Low	52.15	52.44	52.09	56.21
Brass, Rod	53.17	53.46	53.11	57.23
Brass, Naval	53.94	60.25	47.75	58.10
Muntz Metal	51.94	....	47.25	....
Comm. Bz.	54.73	55.02	54.67	58.34
Mang. Bz.	57.71	61.54	51.27	....
Phos. Bz. 5%	76.97	76.72	77.47	78.90

Free Cutting Brass Rod 34.77

TITANIUM

(Base 30,000 lb, f.o.b. customer's plant)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17. Plate HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.	32.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be	$ 5.00
Beryllium copper, per lb conta'd Be.	$43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading	$70.00
Bismuth, ton lots	$ 2.25
Cadmium, del'd	$ 1.70
Calcium, 99.9% small lots	$ 4.55
Chromium, 99.8% metallic base	$ 1.31
Cobalt, 97-99% (per lb)	$1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined	$29.95 to $36.95
Gold, U. S. Treas., per troy oz.	$ 2.25
Iridium, dollars per troy oz.	$75 to $85
Lithium, 98%	$9.00 to $12.00
Magnesium sticks, 10,000 lb.	57.00
Mercury dollars per 76-lb flask f.o.b. New York	$188 to $191
Nickel oxide sinter at Buffalo, N. Y. or other U. S. points of entry, contained nickel	77.50
Palladium, dollars per troy oz.	$24 to $26
Platinum, dollars per troy oz.	$82 to $85
Rhodium	$137 to $140
Silver ingots (¢ per troy oz.)	91.375
Thorium, per pg	$43.00
Vanadium	$ 3.65
Zirconium sponge	$ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot	
No. 115	32.00
No. 120	31.25
No. 123	30.50
80-10-10 ingot	
No. 305	36.00
No. 315	33.75
88-10-2 ingot	
No. 210	43.75
No. 215	40.50
No. 245	35.75
Yellow ingot	
No. 405	27.50
Manganese bronze	
No. 421	31.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95.5 aluminum-silicon alloys	
0.30 copper max.	23.25-23.75
0.60 copper max.	23.00-23.50
Piston alloys (No. 132 type)	25.00-26.00
No. 12 alum. (No. 2 grade)	21.25-21.75
108 alloy	21.75-22.25
195 alloy	24.25-24.75
13 alloy (0.60 copper max.)	23.00-23.50
AXS-679 (1 pct zinc)	21.50-22.50

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½%	22.75-23.75
Grade 2—92-95%	21.50-22.50
Grade 3—90-92%	20.50-21.50
Grade 4—85-90%	19.50-20.50

(Effective Nov. 27, 1961)

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27	26¼
Yellow brass	20⅝	18½
Red brass	23⅞	23½
Comm. bronze	24¾	24
Mang. bronze	19¼	18⅛
Free cutting rod ends	19½	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	26¾
No. 2 copper wire	24¾
Light copper	22½
*Refining brass	23½
Copper bearing material	22⅛

*Dry Copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	26¾
No. 2 copper wire	24¾
Light copper	22½
No. 1 composition	24
No. 1 comp. turnings	23½
Hvy. yellow brass solids	17 —17½
Heavy yellow brass turnings	16 —16½
Radiators	20
Aluminum	
Mixed old cast.	12 —12½
Mixed new clips	14 —14½
Mixed turnings, dry	13 —13½

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	23 —23½
No. 2 copper wire	21 —21½
Light copper	18¾—19¼
Auto radiators (unsweated)	16¼—16½
No. 1 composition	20 —20½
No. 1 composition turnings	19½—20
Cocks and faucets	16½—17
Clean heavy yellow brass	14¼—14½
Brass pipe	16¼—16¾
New soft brass clippings	17¾—18¼
No. 1 brass rod turnings	15½—16

Aluminum

Alum. pistons and struts	6½— 7
Aluminum crankcase	9 — 9½
1100 (2s) aluminum clippings	11¼—11¾
Old sheet and utensils	9 — 9½
Borings and turnings	4¼— 4¾
Industrial castings	8¾— 9¼
2020 (24S) clippings	10 —10½

Zinc

New zinc clippings	5 — 5¼
Old zinc	3 — 3¼
Zinc routings	1¾— 2
Old die cast scrap	1¾— 2

Nickel and Monel

Pure nickel clippings	56 —58
Clean nickel turnings	43
Nickel anodes	60 —62
Nickel rod ends	56 —58
New Monel clippings	24 —26¾
Clean Monel turnings	18½—19
Old sheet Monel	32
Nickel silver clippings, mixed	24
Nickel silver turnings, mixed	21

Lead

Soft scrap lead	6¼— 6½
Battery plates (dry)	2 — 2¼
Batteries, acid free	1¼— 1½

Miscellaneous

Block tin	90 —92
No. 1 pewter	64 —66
Auto babbitt	45 —46
Mixed common babbitt	9½—10
Solder joints	13¾—14¼
Small foundry type	8 — 8½
Monotype	8¼— 8¾
Lino. and stereotype	7½— 7¾
Electrotype	7 — 7¼
Hand picked type shells	5¼— 5¾
Lino. and stereo. dross	1 — 1½
Electro dross	1¾— 2¼

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$99.50 *A2*	$121.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*	8.10 *P2*	5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.425 *A1, T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3, Y1*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Struthers, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*		5.50 *Y1*			5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, N. Castle, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *B4, M10*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

Electro-galvanized-plus galvanizing extras

(Effective Nov. 27, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Electro-galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.		Cokes* *1.25*-lb. base box	Electro** *0.25*-lb. base box	Thin *0.25* lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*					7.525 *B3*	9.275 *B3*	6.40 *W6, S15*	†Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		Prices are for 50 lb. base box; for 45 lb. deduct 15¢; for 55 lb. add 15¢; for 60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*					7.575 *A2*					
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*					7.575 *U1*	9.325 *U1*			$9.10 *U1*	$6.25 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*		6.775 *B3*		7.525 *B3*	9.275 *B3* 10.025 *B3**	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*	**Hollowware Enameling** *29* ga.—*7.85 U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; *7.95 G2* at Granite City.		
	Ashland, Ky.	5.10 *A7*		6.875 *A7*		6.775 *A7*		7.525 *A7*					
	Canton-Massillon, Dover, Canfield, Ohio			6.875 *R1, R3*	7.50 *C19*								
	Chicago, Joliet, Ill.	5.10 *W8, A1*						7.525 *U1, W8*		6.40 *A5, R3,W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*		7.65 *R3*	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*	6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*					7.525 *G3*	9.275 *G3*				
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3,Y1*	6.275 *U1, I3,Y1*	6.875 *U1, I3, Y1.*		6.775 *U1, I3,Y1*	7.225 *U1*	7.525 *U1, Y1,I3*	9.275 *U1, Y1*	6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1Y1,*	$6.25 *U1,I3*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*				7.225 *E2*						
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	7.225 *A7*	6.775 *A7*	7.225 *A7*						
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3*	7.65 *R3*	6.775 *S1*	7.225 *S1*†† *R3*	7.525 *R3, S1*	9.275 *R3*			$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	5.10 *U1, J3,P6*	6.275 *U1, J3,P6*	6.875 *U1, J3*	7.50 *E3*	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3* 10.125 *U1, J3**	6.40 *A5, J3,P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3,W5*	6.875 *W3, W5*	7.50 *W3*		7.225 *W3*	7.525 *W3*	9.275 *W3*		$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*			6.775 *Y1*		7.525 *Y1*	9.275 *Y1*	6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*					8.25 *K1*	10.40 *K1*		$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*		6.775 *T2*				6.40 *T2,R3*	$10.40 *T2*	$9.10 *T2*	$6.25 *T2*
	Houston, Texas									6.65 *S2*			

* Hi Str. Low Alloy Galv. ** For 55 lb.; for 60 lb. add 15¢.

†† 7.425 at Sharon; Niles is 7.225.

(Effective Nov. 27, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3, S15*	Listing reinforcing bar prices has been suspended. Major producers now quote prices only in response to specific inquiries.	7.70 *B5*	6.725 *B3,R3, S15*	9.025 *B3,B5, S15*	8.30 *B3*	5.30 *B3*				8.00 *W6, S15*
	Claymont, Del.							5.30 *P2*	6.375 *P2*	7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*										
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*			6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.											
	Fairless, Pa.	5.825 *U1*										
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.							5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*		7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,13*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*		7.65 *A5,C13, W13*		9.025 *A5, C13,W13*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,W13*
	Detroit, Plymouth, Mich.	5.675 *G3*		7.90 *P3* 7.85 *P8B5H2* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8, H2* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,13, Y1*		7.65 *R3,J3*	6.725 *U1,13, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,13, Y1*	6.375 *J3, Y1*	7.50 *U1, Y1*	7.95 *U1, Y1,13*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.											8.10 *C9*
	Sterling, Ill.	5.775 *N4*					7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*		7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*		7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.375 *K1*			7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*			6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*		9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*						6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*					9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*			7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga. Jacksonville, Fla.	5.875 *A8*										8.00 *A8* 8.35 *M4*
	Fairfield, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*		8.10 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*			6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher.

(Effective Nov. 27, 1961)

* Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1	Acme Steel Co., Chicago
A2	Alan Wood Steel Co., Conshohocken, Pa.
A3	Allegheny Ludlum Steel Corp., Pittsburgh
A4	American Cladmetals Co., Carnegie, Pa.
A5	American Steel & Wire Div., Cleveland
A6	Angel Nail & Chaplet Co., Cleveland
A7	Armco Steel Corp., Middletown, Ohio
A8	Atlantic Steel Co., Atlanta, Ga.
A9	Acme-Newport Steel Co., Newport, Ky
A10	Alaska Steel Mills, Inc., Seattle, Wash.
B1	Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2	Bethlehem Steel Co., Pacific Coast Div.
B3	Bethlehem Steel Co., Bethlehem, Pa.
B4	Blair Strip Steel Co., New Castle, Pa.
B5	Bliss & Laughlin, Inc., Harvey, Ill.
B6	Brooke Plant, Wickwire-Spencer Steel Div., Birdsboro, Pa.
B7	A. M. Byers, Pittsburgh
B8	Braeburn Alloy Steel Corp., Braeburn, Pa.
B9	Barry Universal Corp., Detroit, Mich.
C1	Calstrip Steel Corp., Los Angeles
C2	Carpenter Steel Co., Reading, Pa.
C6	Colorado Fuel & Iron Corp., Denver
C7	Columbia Geneva Steel Div., San Francisco
C8	Columbia Steel & Shafting Co., Pittsburgh
C9	Continental Steel Corp., Kokomo, Ind.
C10	Copperweld Steel Co., Pittsburgh, Pa.
C11	Crucible Steel Co. of America, Pittsburgh
C13	Cuyahoga Steel & Wire Co., Cleveland
C14	Compressed Steel Shafting Co., Readville, Mass.
C15	G. O. Carlson, Inc., Thorndale, Pa.
C16	Connors Steel Div., Birmingham
C19	Canfield Steel Co., Canfield, O.
D1	Detroit Steel Corp., Detroit
D2	Driver, Wilbur B., Co., Newark, N. J.
D3	Driver Harris Co., Harrison, N. J.
D4	Dickson Weatherproof Nail Co., Evanston, Ill.
E1	Eastern Stainless Steel Corp., Baltimore
E2	Empire-Reeves Steel Corp., Mansfield, O.
E3	Enamel Products & Plating Co., McKeesport, Pa.
F1	Firth Sterling, Inc., McKeesport, Pa.
F2	Fitzsimons Steel Corp., Youngstown
F3	Follansbee Steel Corp., Follansbee, W. Va.
G2	Granite City Steel Co., Granite City, Ill.
G3	Great Lakes Steel Corp., Detroit
G4	Greer Steel Co., Dover, O.
G5	Green River Steel Corp , Owenboro, Ky.
H1	Hanna Furnace Corp., Detroit
H2	Hercules Drawn Steel Corp., Toledo, O.
I2	Ingersoll Steel Div., New Castle, Ind.
I3	Inland Steel Co., Chicago, Ill.
I4	Interlake Iron Corp., Cleveland
J1	Jackson Iron & Steel Co., Jackson, O.
J2	Jessop Steel Corp., Washington, Pa.
J3	Jones & Laughlin Steel Corp., Pittsburgh
J4	Joslyn Mfg. & Supply Co., Chicago
J5	Judson Steel Corp., Emeryville, Calif.
K1	Kaiser Steel Corp., Fontana, Calif.
K2	Keystone Steel & Wire Co., Peoria
K4	Keystone Drawn Steel Co., Spring City, Pa.
L1	Laclede Steel Co., St. Louis
L2	La Salle Steel Co., Chicago
L3	Lone Star Steel Co., Dallas
L4	Lukens Steel Co., Coatesville, Pa.
M1	Mahoning Valley Steel Co., Niles, O
M2	McLouth Steel Corp., Detroit
M3	Mercer Tube & Mfg. Co., Sharon, Pa.
M4	Mid States Steel & Wire Co., Crawfordsville, Ind.
M7	Milton Steel Products Div., Milton, Pa.
M8	Mill Strip Products Co., Evanston, Ill.
M9	Moltrup Steel Products Co., Beaver Falls, Pa.
M10	Mill Strip Products Co., of Pa., New Castle, Pa.
N1	National Supply Co., Pittsburgh
N2	National Tube Div., Pittsburgh
N4	Northwestern Steel & Wire Co., Sterling, Ill.
N6	Northwest Steel Rolling Mills, Seattle
N7	Newman Crosby Steel Co., Pawtucket, R. I.
N8	Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9	Nelson Steel & Wire Co.
O1	Oliver Iron & Steel Co., Pittsburgh
O2	Oregon Steel Mills, Portland
P1	Page Steel & Wire Div., Monessen, Pa.
P2	Phoenix Steel Corp., Phoenixville, Pa.
P3	Pilgrim Drawn Steel Div., Plymouth, Mich.
P4	Pittsburgh Coke & Chemical Co., Pittsburgh
P6	Pittsburgh Steel Co., Pittsburgh
P7	Portsmouth Div., Detroit Steel Corp., Detroit
P8	Plymouth Steel Co., Detroit
P9	Pacific States Steel Co., Niles, Cal.
P10	Precision Drawn Steel Co., Camden, N. J.
P11	Production Steel Strip Corp., Detroit
P13	Phoenix Mfg. Co., Joliet, Ill.
P14	Pacific Tube Co.
P15	Philadelphia Steel and Wire Corp.
R1	Reeves Steel & Mfg. Div., Dover, O.
R2	Reliance Div., Eaton Mfg. Co., Massillon, O.
R3	Republic Steel Corp., Cleveland
R4	Roebling Sons Co., John A., Trenton, N. J.
R5	Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6	Rodney Metals, Inc., New Bedford, Mass.
R7	Rome Strip Steel Co., Rome, N. Y.
S1	Sharon Steel Corp., Sharon, Pa.
S2	Sheffield Steel Div., Kansas City
S3	Shenango Furnace Co., Pittsburgh
S4	Simonds Saw and Steel Co., Fitchburg, Mass.
S5	Sweet's Steel Co., Williamsport, Pa.
S7	Stanley Works, New Britain, Conn.
S8	Superior Drawn Steel Co., Monaca, Pa.
S9	Superior Steel Div. of Copperweld Steel Co.
S10	Seneca Steel Service, Buffalo
S11	Southern Electric Steel Co., Birmingham
S12	Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13	Seymour Mfg. Co., Seymour, Conn.
S14	Screw and Bolt Corp. of America, Pittsburgh, Pa.
S15	Seaway Steel Div., Roblin-Seaway Ind., Inc., North Tonawanda, N. Y.
T1	Tonawanda Iron Div., N. Tonawanda, N. Y.
T2	Tennessee Coal & Iron Div., Fairfield
T3	Tennessee Products & Chem. Corp., Nashville
T4	Thomas Strip Div., Warren, O.
T5	Timken Steel & Tube Div., Canton, O
T7	Texas Steel Co., Fort Worth
T8	Thompson Wire Co., Boston
U1	United States Steel Corp., Pittsburgh
U2	Universal Cyclops Steel Corp., Bridgeville, Pa
U3	Ulbrich Stainless Steels, Wallingford, Conn.
U4	U. S. Pipe & Foundry Co., Birmingham
W1	Wallingford Steel Co., Wallingford, Conn.
W2	Washington Steel Corp., Washington, Pa.
W3	Weirton Steel Co., Weirton, W. Va.
W4	Wheatland Tube Co., Wheatland, Pa.
W5	Wheeling Steel Corp., Wheeling, W. Va.
W6	Wickwire Spencer Steel Div., Buffalo
W7	Wilson Steel & Wire Co., Chicago.
W8	Wisconsin Steel Div., S. Chicago, Ill.
W9	Woodward Iron Co., Woodward, Ala.
W10	Wyckoff Steel Co., Pittsburgh
W12	Wallace Barnes Steel Div., Bristol, Conn.
W13	Western Cold Drawn Steel, Div. of Standard Screw Co., Elyria, O.
Y1	Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities		Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	City Delivery‡ Charge	Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	......	......	......	......
Baltimore	$.10	9.60	10.36	10.16	11.35	9.70	9.95	9.75	11.80	17.48	16.48	21.58	20.83
Birmingham		9.11	11.00	11.39	10.10	9.06	9.12	8.91	13.14	18.84	16.65	22.94	22.19
Boston**	.10	10.00	10.50	11.87	12.50	9.95	10.60	10.15	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	9.45	10.20	11.95	11.85	9.55	10.05	9.60	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.28	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.33	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.81	11.07	11.66	9.45	10.11	9.69	11.40	17.21	16.21	21.31	20.56
Denver		11.55	12.53	13.03	13.72	11.39	11.90	11.55	12.98	......	......	......	20.84
Detroit**	.15	9.63	10.61	10.65	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		8.67	9.48	11.35[3]	10.23	8.20	8.31	8.08	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	10.53	11.37	10.95	12.70	10.39	10.91	10.55	11.72	17.17	15.87	21.87	21.12
Los Angeles		10.35[1]	12.15	12.20	12.40	10.30	10.45	10.25	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.78	10.50	10.95	11.44	9.47	9.82	9.63	12.85	18 59	16 68	22 69	21 04
Milwaukee**	.15	9.51	10.49	10.42	11.68	9.35	9.94	9.51	11.04	17.24	16.24	21.34	20.49
New York**	.10	9.91	10.44	11.64	13.67	9.99	10.45	10.15	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	......	......	8.90	8.65	9.20	8.90	10.70	......	......	......	......
Philadelphia	.10	9.90	10.10	10.99	11.35	9.70	9.95	9.75	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.81	11.83	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		10.40	12.25	12.35	12.40	10.55	11.00	10.40	16.65	18.60	17.85	22.70	22.15
San Francisco	.10	10.75	11.75[2]	11.95	12.80	10.90	11.20	10.65	15.20	18.30	17.35	22.90	22.20
Seattle		11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.85	22.65	22.15
Spokane	.15	11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.85	22.65	22.15
St. Louis**	.15	9.57	10.73	10.66	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	20.63
St. Paul	.15	8.97	9.64	10.79	11.14	8.81	9.32	8.97	11.64	......	16.69	21 79	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—¾-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13c zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier: [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective Nov. 27, 1961)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	....	....
Birmingham *W9*	62.00	62.50*	66.50	....	....
Birmingham *U4*	62.00	62.50*	66.50	....	....
Buffalo *R3*	66.00	66.50	67.00	67.50	....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	....
Chester *P2*	68.00	68.50	69.00	....	....
Chicago *I4*	66.00	66.50	66.50	67.00	71.00†
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	....	....	....
Geneva, Utah *C7*	66.00	66.50	....	....	....
Granite City *G2*	67.90	68.40	68.90	....	....
Hubbard *Y1*	....	....	66.50	....	....
Ironton, Utah *C7*	66.00	66.50	....	....	....
Lyles, Tenn. *T3*		....	....	....	73.00
Midland *C11*	66.00	....	....	....	....
Minnequa *C6*	68.00	68.50	69.00	....	....
Monessen *P6*	66.00	....	....	....	....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	....	66.50	67.00	67.50	....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	....	66.50	67.00	....
So. Chicago *R3*	66.00	66.50	66.50	67.00	....
So. Chicago *W8*	66.00	....	66.50	67.00	....
Swedeland *A2*	68.00	68.50	69.00	69.50	71.00†
Toledo *I4*	66-00	66.50	66.50	67.00	....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	....	....	66.50	....	....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)	*Pct*
Plain finish—packaged and bulk.	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)	*Pct*
Plain finish—packaged and bulk.	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk.	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

(Minimum plating charge — $10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Discount Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50	32.00	29.50	47.50	38.00	46.50	—	19.25-21.50	—	19.75-21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	26.75	29.25-26.75	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	31.50	35.00-31.50	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	42.25	71.75	54.75	64.75	30.00	30.00	31.25 31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	43.50	46.75	45.00	49.50	56.75	49.50	76.75	62.25	75.25	40.25	40.25	42.50	38.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	29.75	33.25-29.75	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown, *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7,* Wallingford, Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6;* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1:* Claymont, Del; *P2.*

Forging billets: Ambridge Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

		Discount Hex	Discount Square
Full Cartons		46	57
Bulk			
¼ in. diam or smaller	25,000 pcs		
5/16 or ⅜ in. diam		56	60
	15,000 pcs		
		56	60

Rivets

	Base per 100 *lb*
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

NOTE: Ferroalloy prices are published in alternate issues.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	AISI
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium..					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Nov. 27, 1961)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	...	...	...	...	...	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	...	...	...	...	...	9.00	9.55
Chicago *W7*	173	...	...	...	...	9.00	9.55†
Cleveland *A6*	...	...	...	...	...	...	...
Cleveland *A5*	...	...	...	...	...	9.00	...
Crawf'dsv. *M4***	175	192	...	214	198	9.10	9.80
Donora Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	...	...	...	...	...	...
Houston *S2*	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	175	192	...	214	198	9.10	9.80††
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	...	...	...	...	...	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass. *W6*	...	...	...	...	...	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.95	10.50
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	...	...	...	236	...	9.95	10.50
SparrowsPt. *B3***	175	...	...	215	198	9.10	9.775
Struthers, O. *Y1**	...	...	...	...	...	8.65	9.20
Worcester *A5*	179	...	...	...	...	9.30	9.85
Williamsport *S5*	...	...	...	...	...	...	...

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only. †† 0.115¢ zinc.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50	....	....	....	....	....	....	....	....
Youngstown *R3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	....	....	....	....	....	....	....	....
Fontana *K1*	+10.75	+26.00	+7.75	+22.00	+4.25	+17.50	+1.75	+16.75	+1.25	+15.75	+0.75	+15.25	0.75	+15.50	....	....	....	....	....	....	....	....
Pittsburgh *J3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Alton, Ill. *L1*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50	....	....	....	....	....	....	....	....
Sharon *M3*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	....	....	....	....	....	....	....	....
Fairless *N2*	0.25	+15.0	3.25	+11.0	6.75	+6.50	9.25	+5.75	9.75	+4.75	10.25	+4.25	11.75	+4.50	....	....	....	....	....	....	....	....
Pittsburgh *N1*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Wheeling *W5*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	....	....	....	....	....	....	....	....
Wheatland *W4*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	....	....	....	....	....	....	....	....
Youngstown *Y1*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
Indiana Harbor *Y1*	1.25	+14.0	4.25	+10.0	7.75	+5.50	10.25	+4.75	10.75	+3.75	11.25	+3.25	12.75	+3.50	....	....	....	....	....	....	....	....
Lorain *N2*	2.25	+13.0	5.25	+9.0	8.75	+4.50	11.25	+3.75	11.75	+2.75	12.25	+2.25	13.75	+2.50	+12.25	+27.25	+5.75	+22.50	+3.25	+20.0	+1.75	+18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50	....	....	....	....	....	....	....	....
Youngstown *R3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	....	....	....	....	....	....	....	....
Fairless *N2*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50	....	....	....	....	....	....	....	....
Fontana *K1*	+6.25	....	+2.25	....	0.75	....	1.25	....	1.75	....	2.25	....	2.75	....	....	....	....	....	....	....	....	....
Pittsburgh *J3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Alton, Ill. *L1*	4.75	+9.0	8.75	+5.0	11.75	+0.50	12.25	+1.75	12.75	+0.75	13.25	+0.25	13.75	+1.50	....	....	....	....	....	....	....	....
Sharon *M3*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	....	....	....	....	....	....	....	....
Pittsburgh *N1*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Wheeling *W5*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	....	....	....	....	....	....	....	....
Wheatland *W4*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	....	....	....	....	....	....	....	....
Youngstown *Y1*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50
Indiana Harbor *Y1*	5.75	+8.0	9.75	+4.0	12.75	0.50	13.25	+0.75	13.75	0.25	14.25	0.75	14.75	+0.50	....	....	....	....	....	....	....	....
Lorain *N2*	6.75	+7.0	10.75	+3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	+10.75	+24.75	+3.25	+19.0	+0.75	+16.50	4.25	+11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 9.83¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

	Net-Ton
Furnace, beehive (f.o.b.)	
Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.70
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New Haven, f.o.b.	31.00
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RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	7.025	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT				
	0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Anderson, Ind. *G4*	9.10	......	......	......	......
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	......	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	......	......
Detroit *D1*	9.05	10.50	12.70	15.70	......
Detroit *D2*	9.05	10.50	12.70	......	......
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	15.60	......
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	......	......	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	......
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	......
New Castle, Pa. *M10*	8.95	10.40	12.60	15.60	......
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	......
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	......	10.70	12.90	16.10	19.30
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	44.50
Electrodeposited, 5000 lb lots	37.50
OFHC anodes, 3 in. diam. (5000 lb)	42.50
Brass, 80-20, ball anodes, 2000 lb or more	51.50
Zinc, ball anodes, 2000 lb lots	18.25
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carbon, 5000 lb	1.05
(Rolled depolarized add 3¢ per lb)	
Cadmium, 5000 lb	1.60

Tin, ball anodes $1.26 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum, N. Y.	65.90
Copper sulphate, 25.2 Cu min, 6000 lbs per cwt, Detroit	17.45
Nickel sulfate, 5000 lbs	31.00
Nickel chloride, freight allowed, 100 lb	47.50
Sodium cyanide, domestic, del'd east of Rockies, 200 lb drums	25.80
Zinc cyanide, 100 lb, N. Y.	61.50
Potassium cyanide, 100 lb drum Chicago, del'd east of Rockies	46.50
Chromic acid, flake type, 10,000 lb or more, N. Y.	30.94

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots or over, except as noted)

Iron Powders		
Molding grade, domestic and foreign, 98 pct Fe, 100 mesh bags, freight allowed east of Miss. R.		11.50
Electrolytic Iron, melting stock, 99.87 pct Fe, truckload lots		25.75
Carbonyl Iron (200 lb lots)		88.00
Welding Grades		8.10
Cutting and Scarfing Grades		9.85
Hydrogen reduced, domestic		11.25
Copper Powders		
Molding Grades		
Electrolytic, domestic, f.o.b. shipping point.		15.00†
Atomized	44.3 to	62.3
Reduced		15.00†
Chemically Precipitated		45.5
Brass, 5000-lb lots	33.1 to	50.3
Bronze, 5000-lb lots	51.5 to	56.8
Chromium, electrolytic		5.00
Lead		7.50†
Manganese, electrolytic		$1.00
Molybdenum	$3.60 to	$4.35
Nickel		$1.15
Carbonyl Nickel, 20,000 lb lots		$1.01
Nickel-Silver, 5000 lb lots	56.0 to	68.0
Silicon		70.00
Solder		7.00†
Stainless Steel, 316		$1.07
Stainless steel 304		89.00
Tin		15.00†
Titanium, 99.25 + pct, per lb, f.o.b.		$11.25
Tungsten, carbide grades		$3.25
Zinc	19.5 to	32.7

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† Plus cost of metal.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length)	
		Semi-Processed	Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*): Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

CLAD STEEL

Base prices, cents per lb f.o.b.

Cladding	Plate (*L4, P2, A3, J2*)			Sheet (*I2*)
	10 pct	15 pct	20 pct	20 pct
Stainless Type 302	......	......	......	37.50
304	28.80	31.55	34.30	39.75
316	42.20	46.25	50.25	58.25
321	34.50	37.75	41.05	47.25
347	40.80	44.65	48.55	57.00
405	24.60	26.90	29.25	.....
410	22.70	24.85	27.00	.....
430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, $43.85; 1 side, $36.60.

(Effective Nov. 27, 1961)

REFRACTORIES

Fire Clay Brick

	Carloads per 1000
Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	133.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays	163.00
Chicago District	168.00
Western Utah	183.00
California	185.00
Super Duty	
Hays, Pa., Athens, Tex., Windham, Warren, O.	163.00-168.00
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union, Pa.	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Standard chemically bonded, Baltimore, Md.	$620.00
Gary, Ind.	658.50
Standard, Pascagoula, Miss.	647.50
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Baltimore	585.00

Magnesite Brick

Standard, Baltimore	$715.00
Chemically bonded, Baltimore	655.00
Chemically bonded, Pascagoula, Miss.	682.50

Grain Magnesite

St. ⅜ to ½-in. grains

	Per net ton
Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b., Pascagoula, Miss.	80.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100, 110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size		Seamless		Elec. Weld
	OD-In.	B.W. Ga.	H.R.	C.D.	H.R.
Babcock & Wilcox Jones & Laughlin * Ohio Seamless Tube Div., Copperweld Steel Co.*	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel	2	13	40.28	47.21	....
	2½	12	54.23	63.57	....
	3	12	62.62	73.40	....
	3½	11	73.11	85.70	....
	4	10	97.08	113.80	....

* Electricweld only.

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MERCURY ARC RECTIFIERS
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Primary: 33,000 V. 4160 V. 2300 V.
Secondary 275 to 86 V. with 34 Variable
Taps—Changed under load
4—1320 KVA 3 phase TRANSFORMERS
Primary 4160 V. Delta; Secondary 277 V.
to Neutral with INTERPHASE REACTORS
DC OUTPUT—4000 Ampor Multiple
4400 KW 86 to 275 V. or
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1—100/25 Ton Cleveland, Span 100', 250 Volts D.C.
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4—200/25 Ton Alliance, Span 100', 250 Volts D.C.

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THE CLEARING HOUSE

Market Is 'Healthy' Across the Country

Used machinery dealers are reported in a strong sales market that could hold into 1962.

Philadelphia dealers are in a slight upturn, but still not feeling the impact of defense spending.

▪ The used machinery market may be feeling the first impact of defense spending, but the nationwide distribution of sales appears to be spotty.

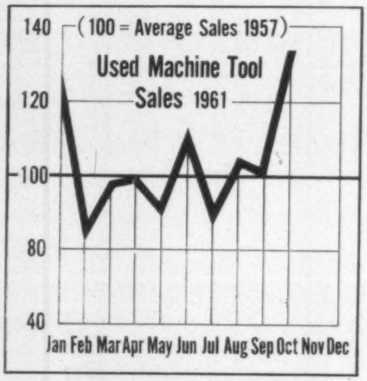
R. K. Vinson, executive director of the Machinery Dealers National Assn., feels the sales market is healthy and credits the October sales rise to defense money. He reports inquiries have been heavy for several weeks, and a healthy trend may be in the making that could hold into 1962.

Mr. Vinson says the association is optimistic about dealers picking up business from middle and small-size customers as defense money sifts through, but he cautions the whole country is still not feeling the surge from government money.

Philadelphia—Dealers in the area are feeling a business upswing, and most report they are in a good position now compared to where they were in the first half of the year.

Generally a pickup has been felt during the third and fourth quarters; one company reports "business is terrific, and we usually don't talk like that." Some used machinery houses have felt the impact of the recovery only in the last two weeks.

Government Money—Few dealers have seen any significant degree of defense money sifting into the Philadelphia market.



Most buying is being done by 'blue chip' firms who demand good late-model machines at a clear savings. The middle and small size buyers are cautious about purchases.

Stock Problems — Good late equipment is not plentiful, and several dealers report large equipment is harder to find than small. Companies now feeling the business pickup, report stocks are being whittled down, but generally they are happy with equipment availability.

When the small buyer comes into the market, it is quite often without adequate finances. The money problem can't be changed, but most dealers report finance companies are liberal to the little man and time payments are easily arranged.

Dealers who specialize in the type of equipment handled, report demand spasmodic with the pace quickening in the last few weeks.

No Foreign Equipt.—There is almost universal agreement that one problem has been answered in the Philadelphia area. Foreign equipment is making no inroads. European dealers can sell at home easier than in the U. S. And American equipment presents far less parts problems.

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100 CFM 150 psi 6 x 7 Ing.
168 CFM 100 psi 7 x 7 Ing.—CPT—Worth
183 CFM 150 psi 7 x 7 Joy WG9.
234 CFM 100 psi 9 x 9 Ing.—Worth Chic. Penn.
306 CFM 100 psi 9 x 7 Joy WG9.
368 CFM 100 psi 12 x 10 Ing. Rand ERI
405 CFM 100 psi 12 x 11 IR—Worth—CP
445 CFM 125 psi 7½-5¾ x 5 Gardner WBH 4010
460 CFM 125 psi 10-6 x 7 Joy WN 102
502 CFM 125 psi 12 x 13 Ing. Rand. Worth.
676 CFM 110 psi 15-9¼ x 12 IR-XCB
125 HP Syn. 3-60-440
636 CFM 100 psi 14 x 13 IR. Worth HB
805 CFM 125 psi 17-10 x 12 Ch. Pn. OCE.
150 HP 3-60-2300 Syn.
877 CFM 125 psi 17/10½x14—IR—XRB.
880 CFM 125 psi 18-11 x 10 Ch. Pn. V-CE
150 HP Syn. 3-60-440/2300
2200 CFM 110 psi 26-15 x 18 CP—OCE.
350 HP Syn. 3-60-4800
2230 CFM 110 psi 25-15 x 12 Ing. Rand XVH.
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1 ton x 11'8" Shaw-Box 1946 DC
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10 ton Cantilever crane 35'0" span 1943 AC
10 ton x 28'0" Shaw-Box 1941 DC
10 ton x 45'0" Bedford 1941 DC
10 ton x 48'6" P&H 1942 AC
10 ton x 67'0" P&H 1942 DC HD
10 ton x 75'0" Northern 1925 AC
15 ton x 79'1½" P&H 1942 DC HD
20 ton 28'10" Shaw-Box DC 1946 DC
25 ton x 99'0" Leonard Burke 1943 AC
30 + 5 ton x 60'0" P&H 1942 AC FO

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1.648 OD x 1.162 ID 24000# 12/16' lgths
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2—17" DIA PULLBACKS
MOVING DOWN TYPE
WITH INTENSIFIER
SN. S.O. 520500-1-2-3
WT. 620,000#
FRACTION OF ORIGINAL COST

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1—7-Stand 10" 3-Hi Bar Mill, driven by 800 H.P. AC Motor, and including Hot Bed.

1—6-Stand 9" 3-Hi Bar Mill, driven by 1000 H.P. AC Motor.

1—72" 2-Hi 17-Roll Leveller, enclosed gearing, universal spindles.

19—8" Dia. x 4"/6"/8" Face 2-Hi Cold Mills with 25 H.P. Motors 230 v. DC, Edge Rollers, Coilers, etc.—complete.

2—10" Dia. x 10"/16" Face 2-Hi Cold Mills with 40/65 H.P. Motors 230 v. DC, Edge Rollers, Coilers, etc.—complete.

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75 Ton 12"x10"x18' WF 53# Beams

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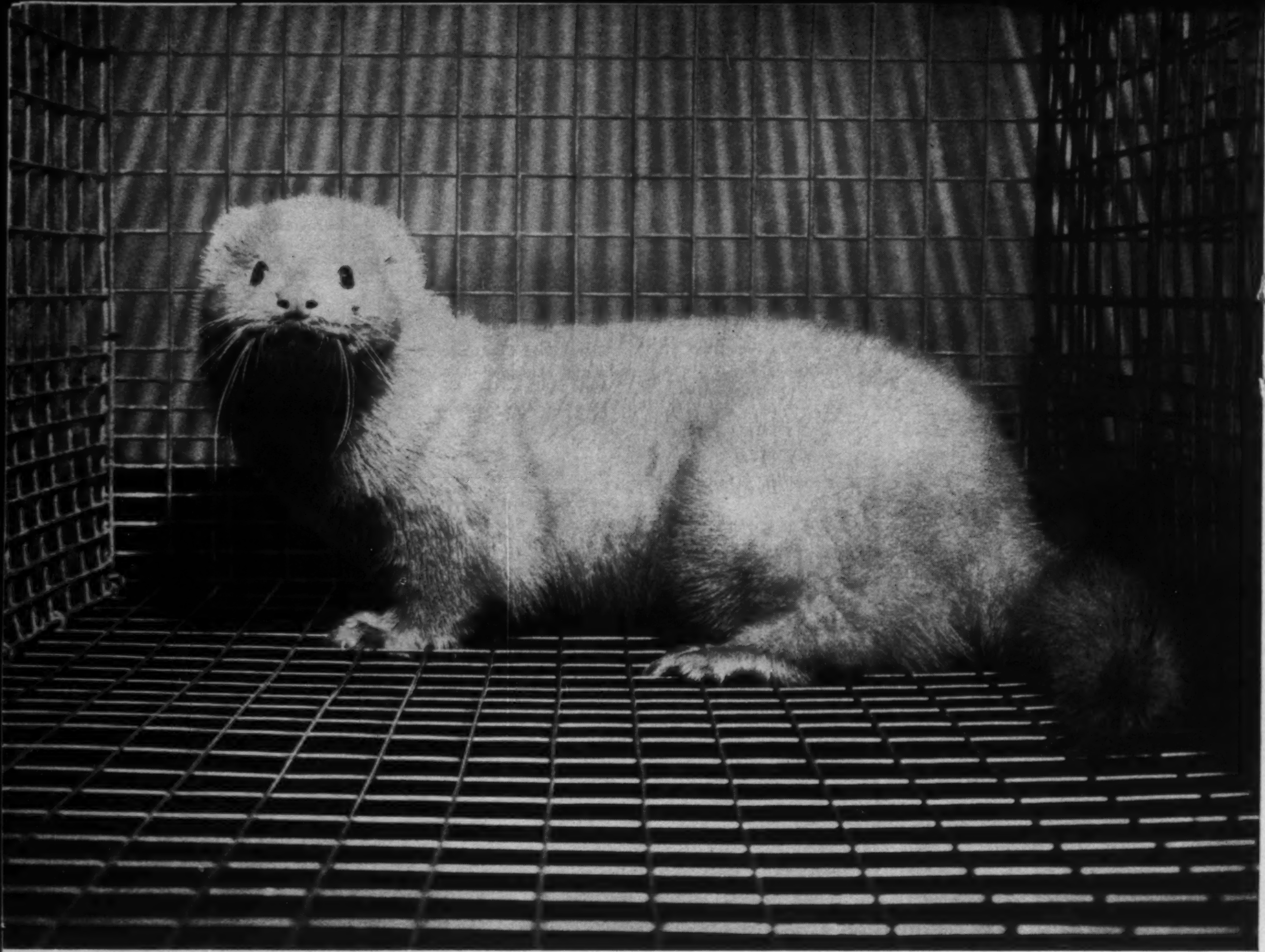

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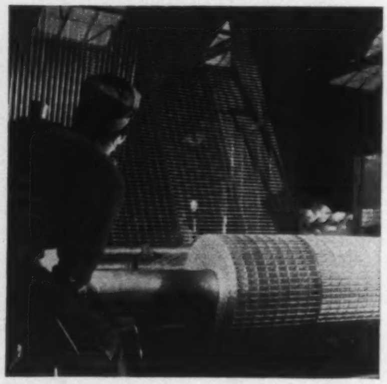

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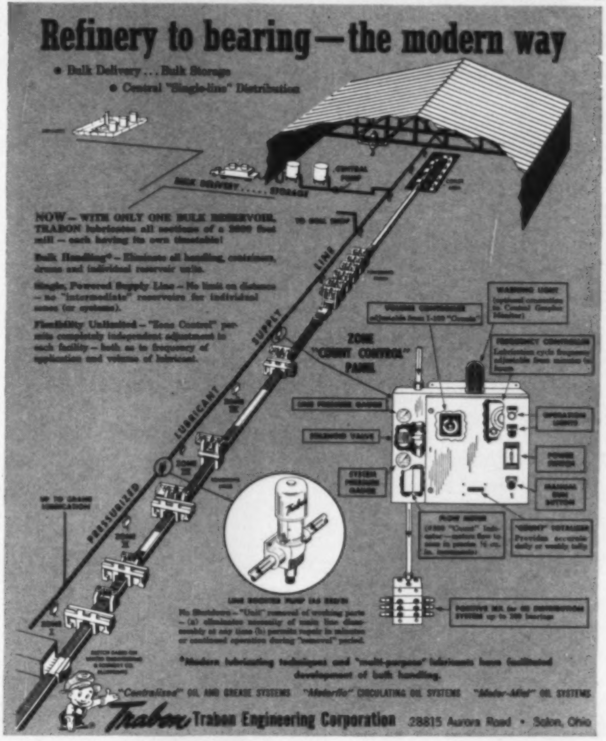

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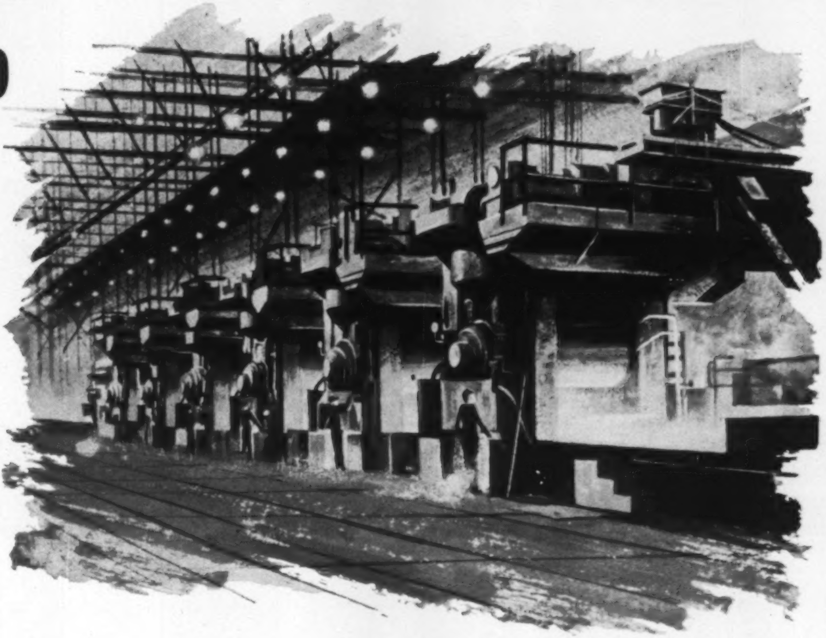

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